

10/092,317

(FILE 'HOME' ENTERED AT 14:35:32 ON 15 OCT 2003).

FILE 'REGISTRY' ENTERED AT 14:35:48 ON 15 OCT 2003

L1 32 S FE AND (BE OR MG OR CA OR SR OR BA) AND (B OR AL OR GA OR IN)  
L2 24 S (LI OR NA OR K) AND FE AND (BE OR MG OR CA OR SR OR BA) AND (

FILE 'CAPLUS' ENTERED AT 14:38:29 ON 15 OCT 2003

FILE 'REGISTRY' ENTERED AT 14:50:26 ON 15 OCT 2003

L3 0 S (LI OR NA OR K) AND FE AND (BE OR MG OR CA OR SR OR BA) AND (

FILE 'CAPLUS' ENTERED AT 14:54:23 ON 15 OCT 2003

FILE 'REGISTRY' ENTERED AT 14:58:36 ON 15 OCT 2003

L4 0 S (LI AND NA) AND FE AND (BE OR MG OR CA OR SR OR BA) AND (B OR  
L5 0 S (LI AND K) AND FE AND (BE OR MG OR CA OR SR OR BA) AND (B OR  
L6 0 S (NA AND K) AND FE AND (BE OR MG OR CA OR SR OR BA) AND (B OR  
L7 0 S (LI AND NA AND K) AND FE AND (BE OR MG OR CA OR SR OR BA) AND  
L8 0 S (LI) AND FE AND (BE OR MG OR CA OR SR OR BA OR RA) AND (B OR  
L9 0 S (LI) AND FE AND (BE OR MG OR CA OR SR OR BA OR RA) AND (B OR  
L10 0 S (LI AND NA) AND FE AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L11 0 S (LI AND K) AND FE AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L12 0 S (K AND NA) AND FE AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L13 0 S (LI AND K AND NA) AND FE AND (BE OR MG OR CA OR SR OR BA OR R  
L14 0 S (LI) AND CO AND (BE OR MG OR CA OR SR OR BA OR RA) AND (B OR  
L15 0 S (LI AND NA) AND CO AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L16 0 S (LI AND K) AND CO AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L17 0 S (NA AND K) AND CO AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L18 0 S (LI AND NA AND K) AND CO AND (BE OR MG OR CA OR SR OR BA OR R  
L19 0 S (LI) AND NI AND (BE OR MG OR CA OR SR OR BA OR RA) AND (B OR  
L20 0 S (LI AND NA) AND NI AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L21 0 S (LI AND K) AND NI AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L22 0 S (NA AND K) AND NI AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L23 0 S (LI AND NA AND K) AND NI AND (BE OR MG OR CA OR SR OR BA OR R  
L24 0 S (LI OR NA OR K) AND NI AND (BE OR MG OR CA OR SR OR BA OR RA)  
L25 0 S (LI OR NA OR K) AND FE AND (BE OR MG OR CA OR SR OR BA OR RA)  
L26 0 S (LI OR NA OR K) AND CO AND (BE OR MG OR CA OR SR OR BA OR RA)  
L27 0 S (LI OR NA OR K) AND TI AND (BE OR MG OR CA OR SR OR BA OR RA)  
L28 0 S (LI AND NA) AND TI AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L29 0 S (LI AND K) AND TI AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L30 0 S (NA AND K) AND TI AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L31 0 S (LI AND NA AND K) AND TI AND (BE OR MG OR CA OR SR OR BA OR R  
L32 0 S (LI OR NA OR K) AND V AND (BE OR MG OR CA OR SR OR BA OR RA)  
L33 0 S (LI AND K) AND V AND (BE OR MG OR CA OR SR OR BA OR RA) AND (  
L34 0 S (NA AND K) AND V AND (BE OR MG OR CA OR SR OR BA OR RA) AND (  
L35 0 S (NA AND K) AND V AND (BE OR MG OR CA OR SR OR BA OR RA) AND (  
L36 0 S (LI AND NA AND K) AND V AND (BE OR MG OR CA OR SR OR BA OR RA)  
L37 0 S (LI AND NA) AND V AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L38 0 S (LI OR NA OR K) AND CR AND (BE OR MG OR CA OR SR OR BA OR RA)  
L39 0 S (LI AND NA AND K) AND CR AND (BE OR MG OR CA OR SR OR BA OR R  
L40 0 S (LI AND NA) AND CR AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L41 0 S (NA AND K) AND CR AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L42 0 S (LI AND K) AND CR AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L43 0 S (LI AND NA AND K) AND MN AND (BE OR MG OR CA OR SR OR BA OR R  
L44 0 S (LI OR NA OR K) AND MN AND (BE OR MG OR CA OR SR OR BA OR RA)  
L45 0 S (LI AND K) AND MN AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L46 0 S (LI AND NA) AND MN AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L47 0 S (NA AND K) AND MN AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L48 0 S (LI AND NA AND K) AND (BE OR MG OR CA OR SR OR BA OR RA) AND  
L49 2 S (LI OR NA OR K) AND (BE OR MG OR CA OR SR OR BA OR RA) AND (B  
L50 0 S (NA AND K) AND (BE OR MG OR CA OR SR OR BA OR RA) AND (B OR A  
L51 0 S (LI AND NA) AND (BE OR MG OR CA OR SR OR BA OR RA) AND (B OR

L52

0 S (LI AND K) AND (BE OR MG OR CA OR SR OR BA OR RA) AND (B OR A

FILE 'CAPLUS' ENTERED AT 15:18:40 ON 15 OCT 2003

L53

59 S L49

(FILE 'HOME' ENTERED AT 16:44:12 ON 15 OCT 2003)

FILE 'REGISTRY' ENTERED AT 16:44:21 ON 15 OCT 2003

L1 0 S (LI OR NA OR K) AND (SC OR Y OR LA OR AC) AND (BE OR MG OR CA  
L2 0 S (LI AND NA AND K) AND (SC OR Y OR LA OR AC) AND (BE OR MG OR  
L3 0 S (LI AND NA) AND (SC OR Y OR LA OR AC) AND (BE OR MG OR CA OR  
L4 0 S (LI AND K) AND (SC OR Y OR LA OR AC) AND (BE OR MG OR CA OR S  
L5 0 S (NA AND K) AND (SC OR Y OR LA OR AC) AND (BE OR MG OR CA OR S  
L6 2 S (LI OR NA OR K) AND (B OR AL OR GA OR IN OR TL) AND (BE OR MG  
L7 0 S (LI AND NA AND K) AND (B OR AL OR GA OR IN OR TL) AND (BE OR  
L8 0 S (LI AND NA) AND (B OR AL OR GA OR IN OR TL) AND (BE OR MG OR  
L9 0 S (LI AND K) AND (B OR AL OR GA OR IN OR TL) AND (BE OR MG OR C  
L10 0 S (NA AND K) AND (B OR AL OR GA OR IN OR TL) AND (BE OR MG OR C

FILE 'CAPLUS' ENTERED AT 16:49:13 ON 15 OCT 2003

L11 59 S L6

FILE 'REGISTRY' ENTERED AT 16:49:52 ON 15 OCT 2003

L12 2 S (LI OR NA OR K) AND (B OR AL OR GA OR IN OR TL) AND (BE OR MG  
L13 0 S L12 NOT L6  
L14 95 S (LI OR NA OR K) AND FE AND (BE OR MG OR CA OR SR OR BA OR RA  
L15 0 S (LI OR NA OR K) AND FE AND (BE OR MG OR CA OR SR OR BA OR RA

FILE 'CAPLUS' ENTERED AT 17:06:09 ON 15 OCT 2003

L16 420260 S L14

L17 14211 S L16 (S) (ELECTRODE OR ANODE OR CATHODE)

FILE 'REGISTRY' ENTERED AT 17:08:42 ON 15 OCT 2003

FILE 'CAPLUS' ENTERED AT 17:08:47 ON 15 OCT 2003

L18 29 S L16 AND (LITHIUM (2A) IRON (3A) PHOSPHATE)

	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments	Error Definition	Errors
1	IS&R	L1	1	("20020124386").PN.	US-P GPUB	2003/10/1 5 16:56			0
2	IS&R	L2	1	("20020150816").PN.	US-P GPUB	2003/10/1 5 16:57			0
3	BRS	L3	2	"2001307726"	EPO; JPO; DERW ENT	2003/10/1 5 16:58			0
4	BRS	L4	6	"1094532"	EPO; JPO; DERW ENT	2003/10/1 5 17:11			0
5	BRS	L5	95	(BARKER near3 JEREMY).in.	USPA T; US-P GPUB ; EPO; JPO; DERW ENT	2003/10/1 5 17:15			0
6	BRS	L6	53	(SAIDI near3 YAZID ) .in.	USPA T; US-P GPUB ; EPO; JPO; DERW ENT	2003/10/1 5 17:17			0
7	BRS	L7	23	(SWOYER near3 JEFFREY).in.	USPA T; US-P GPUB ; EPO; JPO; DERW ENT	2003/10/1 5 17:18			0
8	BRS	L8	110	5 6 7	USPA T; US-P GPUB ; EPO; JPO; DERW ENT	2003/10/1 5 17:18			0
9	BRS	L9	22	8 and (lithium near4 phosphate)	USPA T; US-P GPUB ; EPO; JPO; DERW ENT	2003/10/1 5 17:18			0

10/092,317

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L18 ANSWER 1 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN  
 ACCESSION NUMBER: 2003:757154 CAPLUS  
 TITLE: Layered electrodes for lithium cells and batteries  
 INVENTOR(S): Johnson, Christopher S.; Thackeray, Michael M.;  
 Vaughey, John T.; Kahaian, Arthur J.; Kim, Jeom-soo  
 PATENT ASSIGNEE(S): The University of Chicago, USA  
 SOURCE: U.S. Pat. Appl. Publ., 28 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2003180616	A1	20030925	US 2003-365286	20030212
PRIORITY APPLN. INFO.:			US 2002-357393P	P 20020215
IT	Battery cathodes Battery electrodes (layered electrodes for lithium cells and batteries)			
IT	Metals Oxides (inorganic) RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process) (layered electrodes for lithium cells and batteries)			
IT	Intermetallic compounds Nitrides RL: DEV (Device component use); USES (Uses) (layered electrodes for lithium cells and batteries)			
IT	Inorganic compounds RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses) (layered; layered electrodes for lithium cells and batteries)			
IT	Secondary batteries (lithium; layered electrodes for lithium cells and batteries)			
IT	109-72-8, n-Butyllithium 546-68-9 1310-66-3, Lithium hydroxide monohydrate 7308-67-0, Lithium naphthalide 7439-93-2, Lithium 7440-44-0, Carbon <b>7782-42-5</b> , Graphite 244129-80-4, Manganese nickel hydroxide Mn <sub>0.5</sub> Ni <sub>0.5</sub> (OH) <sub>2</sub> RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process) (layered electrodes for lithium cells and batteries)			
IT	96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 21324-40-3, Lithium hexafluorophosphate RL: DEV (Device component use); USES (Uses) (layered electrodes for lithium cells and batteries)			
IT	12031-65-1P, lithium nickel oxide linio <sub>2</sub> 12162-79-7P, lithium manganese oxide limno <sub>2</sub> 12190-79-3P, cobalt lithium oxide colio <sub>2</sub> 13824-63-0P, cobalt lithium phosphate colipo <sub>4</sub> 13826-59-0P, lithium manganese phosphate limpo <sub>4</sub> 15365-14-7P, <b>iron lithium phosphate felipo<sub>4</sub></b> 128975-24-6DP, Lithium manganese nickel oxide LiMn <sub>0.5</sub> Ni <sub>0.5</sub> O <sub>2</sub> , Li intercalated 128975-24-6P, Lithium manganese nickel oxide LiMn <sub>0.5</sub> Ni <sub>0.5</sub> O <sub>2</sub> 176087-62-0P, Lithium manganese oxide Lil-1.33Mn1.67-204 193214-24-3P, Aluminum cobalt lithium nickel oxide Al <sub>0.05</sub> Co <sub>0.15</sub> LiNi <sub>0.80</sub> 309242-27-1P, Cobalt lithium magnesium nickel titanium oxide Co <sub>0.15</sub> LiMg <sub>0.05</sub> Ni <sub>0.75</sub> Ti <sub>0.05</sub> O <sub>2</sub> 346417-97-8P, Cobalt lithium manganese nickel oxide Co <sub>0.33</sub> LiMn <sub>0.33</sub> Ni <sub>0.33</sub> O <sub>2</sub> 448897-02-7DP, Lithium manganese nickel titanium oxide Lil.02Mn0.46Ni0.46Ti0.05O <sub>2</sub> , Li intercalated 448897-02-7P, Lithium manganese nickel titanium oxide			

Li1.02Mn0.46Ni0.46Ti0.05O2 602319-07-3P

RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(layered electrodes for lithium cells and batteries)

IT 7664-41-7, Ammonia

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)

(lithium soln.; layered electrodes for lithium cells and batteries)

TI Layered electrodes for lithium cells and batteries

AB Lithium metal oxide compds. of nominal formula  $\text{Li}_2\text{MO}_2$ , in which M represents two or more pos. charged metal ions, selected predominantly and preferably from the first row of transition metals are disclosed herein. The  $\text{Li}_2\text{MO}_2$  compds. have a layered-type structure, which can be used as pos. electrodes for lithium electrochem. cells, or as a precursor for the in-situ electrochem. fabrication of  $\text{LiMO}_2$  electrodes. The  $\text{Li}_2\text{MO}_2$  compds. of the invention may have addnl. functions in lithium cells, for example, as end-of-discharge indicators, or as neg. electrodes for lithium cells.

L18 ANSWER 2 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2003:717589 CAPLUS

DOCUMENT NUMBER: 139:233058

TITLE: Alkali transition metal phosphates and related electrode active materials

INVENTOR(S): Barker, Jeremy; Saidi, M. Yazid; Swoyer, Jeffrey L.

PATENT ASSIGNEE(S): UK

SOURCE: U.S. Pat. Appl. Publ., 14 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2003170542	A1	20030911	US 2002-92317	20020306
WO 2003077335	A1	20030918	WO 2003-US6998	20030305
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			

PRIORITY APPLN. INFO.: US 2002-92317 A 20020306

IT Battery anodes

Battery cathodes

(alkali transition metal phosphates and related electrode active materials)

IT Oxides (inorganic), uses

RL: DEV (Device component use); USES (Uses)

(alkali transition metal phosphates and related electrode active materials)

IT Carbonaceous materials (technological products)

RL: MOA (Modifier or additive use); USES (Uses)

(alkali transition metal phosphates and related electrode active materials)

IT Chalcogenides

RL: DEV (Device component use); USES (Uses)

(metal; alkali transition metal phosphates and related electrode active materials)

IT 7440-44-0, Carbon, uses **7782-42-5**, Graphite, uses  
 RL: DEV (Device component use); USES (Uses)  
 (alkali transition metal phosphates and related electrode active materials)

IT 595567-51-4P, Lithium nickel phosphate ( $\text{Li}_{0.5}\text{Ni}_{1.25}\text{PO}_4$ ) 595567-52-5P  
 595567-53-6P, **Iron lithium magnesium phosphate**  
 ( $\text{FeLi}_{0.8}\text{Mg}_{0.1}\text{PO}_4$ ) 595567-55-8P 595567-59-2P, **Iron lithium magnesium manganese phosphate**  
 ( $\text{Fe}_{0.5}\text{Li}_{0.8}\text{Mg}_{0.1}\text{Mn}_{0.5}\text{PO}_4$ ) 595567-63-8P, Cobalt lithium magnesium phosphate ( $\text{Co}_{0.6}\text{Li}_{0.5}\text{Mg}_{0.65}(\text{PO}_4)$ )  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
 (alkali transition metal phosphates and related electrode active materials)

TI Alkali transition metal phosphates and related electrode active materials

AB The invention concerns electrode active materials comprising lithium or other alkali metals, a transition metal, and a phosphate or similar moiety, of the formula:  $\text{Aa}+\text{xMbP}_{1-\text{x}}\text{SixO}_4$  wherein (1) A is selected from the group consisting of Li, Na, K, and mixts. thereof, and  $0 < \text{a} < 1.0$  and  $0.1 \leq \text{x} \leq 1$  and (2) M comprises one or more metals, comprising at least one metal which is capable of undergoing oxidn. to a higher valence state, where  $0 < \text{b} \leq 2$ ; and wherein M, a, b, and x are selected so as to maintain electroneutrality of the compd. In a preferred embodiment, M comprises at least one transition metal selected from Groups 4 to 11 of the Periodic Table. In another preferred embodiment, M comprises  $\text{M}'\text{cM}''\text{d}$ , where M' is at least one transition metal from Groups 4 to 11 of the Periodic Table; and M'' is at least one element from Groups 2, 3, 12, 13, or 14 of the Periodic Table, and  $\text{c}+\text{d} = \text{b}$ . Preferably,  $0.1 \leq \text{a} \leq 0.8$ . Preferred embodiments include those having a structure similar to the mineral olivine. This invention also provides electrodes comprising an electrode active material of this invention, and batteries that comprise a first electrode having an electrode active material of this invention; a second electrode; and an electrolyte.

L18 ANSWER 3 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2003:657067 CAPLUS

DOCUMENT NUMBER: 139:167004

TITLE: Manufacture of cathode active mass and secondary nonaqueous electrolyte battery

INVENTOR(S): Okawa, Tsuyoshi; Fukushima, Yuzuru

PATENT ASSIGNEE(S): Sony Corporation, Japan

SOURCE: PCT Int. Appl., 21 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003069701	A1	20030821	WO 2003-JP1192	20030205
W: CN, KR, US				
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR				
JP 2003242974	A2	20030829	JP 2002-37200	20020214
PRIORITY APPLN. INFO.:			JP 2002-37200	A 20020214
IT 7439-93-2,	Lithium, uses <b>7782-42-5</b> , Graphite, uses			
RL: DEV (Device component use); USES (Uses)	(anode; manuf. of cathode active mass contg. <b>lithium iron phosphates</b> for secondary lithium batteries)			

IT 15365-14-7P, Iron lithium phosphate  
(FeLiPO4)  
RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
(Preparation); USES (Uses)  
(cathode active mass; manuf. of cathode active mass contg.  
**lithium iron phosphates** for secondary  
lithium batteries)

IT 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 9011-17-0,  
Hexafluoropropylene-vinylidene fluoride copolymer 21324-40-3, Lithium  
hexafluorophosphate  
RL: DEV (Device component use); USES (Uses)  
(electrolyte; manuf. of cathode active mass contg. **lithium  
iron phosphates** for secondary lithium batteries)

IT 10028-23-6, Ferrous phosphate octahydrate 10377-52-3, Lithium phosphate  
(Li3PO4)  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical  
process); PROC (Process)  
(manuf. of cathode active mass contg. **lithium iron  
phosphates** for secondary lithium batteries)

TI Manufacture of cathode active mass and secondary nonaqueous electrolyte  
battery

AB The active mass, represented by a compn.  $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$  (M = Mn, Cr, Co,  
Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B, and/or Nb; X = 0.05-1.2;  
0.1 to req.  $y < 0.8$ ), is prepd. by mixing  $\text{Fe}_3(\text{PO}_4)_2 \cdot n\text{H}_2\text{O}$  (n = hydration  
no. 0-8) with  $\text{Li}_3\text{PO}_4$ , and firing the raw material mixt.; where the mixt.  
has a half width of the max. peak 1 to req. 1.0 degree. by  $\text{CuK}\alpha$ . X-ray  
diffraction spectrum. The battery, having a cathode contg. the above  
cathode active mass, an anode contg. an anode active mass, and a nonaq.  
electrolyte, is manufd. by prepg. the above required cathode active mass.

REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS  
RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L18 ANSWER 4 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2003:656288 CAPLUS  
DOCUMENT NUMBER: 139:182873  
TITLE: Lithium ion battery with improved safety  
INVENTOR(S): Chen, Chun-Hua; Hyung, Yoo Eup; Vissers, Donald R.;  
Amine, Khalil  
PATENT ASSIGNEE(S): USA  
SOURCE: U.S. Pat. Appl. Publ., 14 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2003157413	A1	20030821	US 2002-77569	20020215
PRIORITY APPLN. INFO.:			US 2002-77569	20020215
IT Battery anodes				
Fire-resistant materials				
Safety				
(lithium ion battery with improved safety)				
IT Secondary batteries				
(lithium; lithium ion battery with improved safety)				
IT 89-32-7 108-05-4, Vinyl acetate, uses 302-01-2, Hydrazine, uses				
486-25-9, 9-Fluorenone 614-99-3, Ethyl-2-furoate 931-40-8,				
4-Hydroxymethyl-1,3-dioxolan-2-one 1025-15-6 4427-96-7, Vinyl ethylene				
carbonate 4437-80-3, 4,4-Dimethyl-5-methylene-1,3-dioxolan-2-one				
14861-06-4, Crotonic acid, vinyl ester 15896-04-5, 4,5-Diethenyl-1,3-				
dioxolan-2-one 19693-75-5 27797-53-1, 1,3-Dioxolan-2-one, 4,5-diphenyl				



40492-31-7, 4-Methoxymethyl-1,3-dioxolan-2-one 51985-12-7 69124-14-7  
 95348-48-4 95924-48-4 130221-78-2 135159-09-0 148481-75-8  
 557084-91-0 579490-82-7, 1,4-Dioxa-2-silacyclopentan-5-one 579490-83-8  
 579490-84-9 581054-51-5 581054-52-6 581054-53-7  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (anode passivation material; lithium ion battery with improved safety)  
 IT 115-86-6, Triphenyl phosphate 463-79-6D, Carbonic acid, cyclic Et ester  
 2752-95-6, Butyl Diphenyl phosphate 7664-38-2D, Phosphoric acid, alkyl  
 Ph ester  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (flame retardant; lithium ion battery with improved safety)  
 IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 616-38-6,  
 Dimethylcarbonate 623-53-0, Ethyl methyl carbonate 1313-99-1, Nickel  
 oxide, uses 1332-37-2, Iron oxide, uses **7782-42-5**, Graphite,  
 uses 7791-03-9, Lithium perchlorate 10124-54-6, Manganese phosphate  
 10377-52-3, Lithium phosphate 10381-36-9, Nickel phosphate 10402-24-1,  
**Iron phosphate** 11104-61-3, Cobalt oxide 11129-60-5,  
 Manganese oxide 12057-24-8, Lithium oxide, uses 14283-07-9, Lithium  
 tetrafluoroborate 17409-91-5, Cobalt phosphate 21324-40-3, Lithium  
 hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate  
 RL: DEV (Device component use); USES (Uses)  
 (lithium ion battery with improved safety)  
 IT 88-12-0, n-Vinyl-2-pyrrolidinone, uses 110-54-3D, Hexane, fluoridated  
 513-08-6, Tripropyl phosphate 2528-36-1, Dibutyl phenyl phosphate  
 4427-92-3, Phenyl ethylene carbonate 23466-13-9, Phosphoric acid,  
 dibutyl vinyl ester 27460-01-1, Diphenyl propyl phosphate 29383-23-1,  
 Vinylimidazole 38299-59-1, Phenyl dipropyl phosphate 54952-38-4  
 105234-62-6 114435-02-8, Fluoroethylene carbonate 171730-81-7  
 581054-54-8  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (lithium ion battery with improved safety)  
 TI Lithium ion battery with improved safety  
 AB A lithium battery with improved safety is disclosed that utilizes one or  
 more additives in the battery electrolyte soln. wherein a lithium salt is  
 dissolved in an org. solvent, which may contain propylene carbonate. For  
 example, a blend of 2 wt% tri-Ph phosphate, 1 wt% di-Ph monobutyl  
 phosphate and 2 wt% vinyl ethylene carbonate additives has been found to  
 significantly enhance the safety and performance of Li-ion batteries using  
 a LiPF<sub>6</sub> salt in EC/DEC electrolyte solvent. The invention relates to both  
 the use of individual additives and to blends of additives such as that  
 shown in the above example at concns. of 1 to 4-wt% in the lithium battery  
 electrolyte. This invention relates to additives that suppress gas  
 evolution in the cell, passivate graphite electrode and protect it from  
 exfoliating in the presence of propylene carbonate solvents in the  
 electrolyte, and retard flames in the lithium batteries.

L18 ANSWER 5 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2003:473087 CAPLUS

DOCUMENT NUMBER: 139:39170

TITLE: Phosphate additives for nonaqueous electrolyte  
 rechargeable electrochemical cells

INVENTOR(S): Gan, Hong; Takeuchi, Esther S.; Rubino, Robert

PATENT ASSIGNEE(S): USA

SOURCE: U.S. Pat. Appl. Publ., 11 pp., Cont.-in-part of U.S.  
 -723,059.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 3

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 2003113635	A1	20030619	US 2002-251137	20020920
US 6203942	B1	20010320	US 1999-303877	19990503
PRIORITY APPLN. INFO.:			US 1998-105279P	P 19981022
			US 1999-303877	A2 19990503
			US 2000-723059	A2 20001127

IT Secondary batteries  
(lithium; phosphate additives for nonaq. electrolyte rechargeable electrochem. cells)

IT Battery electrolytes  
Secondary batteries  
(phosphate additives for nonaq. electrolyte rechargeable electrochem. cells)

IT Carbon black, uses  
Carbon fibers, uses  
Coke  
RL: DEV (Device component use); USES (Uses)  
(phosphate additives for nonaq. electrolyte rechargeable electrochem. cells)

IT Fluoropolymers, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(phosphate additives for nonaq. electrolyte rechargeable electrochem. cells)

IT 7440-44-0, Carbon, uses  
RL: DEV (Device component use); USES (Uses)  
(glassy; phosphate additives for nonaq. electrolyte rechargeable electrochem. cells)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 556-65-0, Lithium thiocyanate 872-36-6, Vinylene carbonate 2923-17-3 2923-20-8 4437-85-8, Butylene carbonate 7439-93-2, Lithium, uses **7782-42-5**, Graphite, uses 7790-69-4, Lithium nitrate 7791-03-9, Lithium perchlorate 11113-67-0, **Iron lithium** oxide 11126-15-1, Lithium vanadium oxide 12031-63-9, Lithium niobium oxide (LiNbO3) 12680-08-9, Lithium titanium sulfide 13453-75-3, Lithium fluorosulfate 14024-11-4, Lithium tetrachloroaluminate 14283-07-9, Lithium tetrafluoroborate 14485-20-2, Lithium tetraphenyl borate 15955-98-3, Lithium tetrachlorogallate 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 37296-91-6, Lithium molybdenum oxide 37367-96-7, Lithium molybdenum sulfide 39300-70-4, Lithium nickel oxide 39302-37-9, Lithium titanium oxide 39457-42-6, Lithium manganese oxide 51177-06-1, Chromium lithium oxide 52627-24-4, Cobalt lithium oxide 56321-19-8, Lithium niobium sulfide 61673-65-2, Lithium niobium selenide 61673-69-6, Lithium titanium selenide 61673-70-9, Lithium titanium telluride 61673-71-0, Lithium vanadium selenide 74245-06-0, Lithium vanadium sulfide 80341-49-7, **Iron lithium** sulfide 90076-65-6 96352-80-6, Lithium molybdenum selenide 96352-81-7, Lithium molybdenum telluride 103288-79-5, Cobalt lithium sulfide 104708-77-2, Copper lithium oxide 115028-88-1 132404-42-3 148884-75-7, Cobalt lithium selenide 264142-74-7, Lithium vanadium telluride 264142-75-8, Chromium lithium sulfide 264142-76-9, Chromium lithium selenide 264142-77-0, Chromium lithium telluride 264142-78-1, Copper lithium sulfide 264142-79-2, Copper lithium selenide 264142-80-5, Copper lithium telluride 264142-81-6, Lithium niobium telluride 264142-82-7, **Iron lithium** selenide 264142-83-8, **Iron lithium** telluride 264142-84-9, Lithium nickel sulfide 264142-85-0, Lithium nickel selenide 264142-86-1, Lithium nickel telluride 264142-87-2, Cobalt lithium telluride 264142-88-3, Lithium manganese sulfide 264142-89-4, Lithium manganese selenide 264142-90-7, Lithium manganese telluride  
RL: DEV (Device component use); USES (Uses)

(phosphate additives for nonaq. electrolyte rechargeable electrochem. cells)

IT 105-58-8, Diethyl carbonate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 623-96-1, Dipropyl carbonate 1623-07-0, Benzyl phosphate 1623-08-1, Dibenzyl phosphate 1623-10-5, Diallyl methyl phosphate 1623-11-6, Allyl dimethyl phosphate 1623-19-4, Triallyl phosphate 1707-92-2, Tribenzyl phosphate 1779-34-6, TriPropargyl phosphate 7748-09-6, Diallyl phosphate 25022-72-4, Allyl phosphate 26292-51-3, Phosphoric acid, methyl bis(phenylmethyl) ester 35363-40-7, Ethyl propyl carbonate 55343-62-9, Propargyl phosphate 56379-74-9 56525-42-9, Methyl propyl carbonate 67293-73-6, Benzyl methyl phosphate 433979-69-2, Phosphoric acid, dimethyl nitromethyl ester 433979-70-5, Dipropargyl phosphate 433979-71-6, Phosphoric acid, cyanomethyl dimethyl ester 433979-72-7, Phosphoric acid, bis(cyanomethyl) methyl ester

RL: MOA (Modifier or additive use); USES (Uses)

(phosphate additives for nonaq. electrolyte rechargeable electrochem. cells)

IT 7429-90-5, Aluminum, uses 7440-02-0, Nickel, uses 7440-32-6, Titanium, uses 12597-68-1, Stainless steel, uses

RL: MOA (Modifier or additive use); USES (Uses)

(powder; phosphate additives for nonaq. electrolyte rechargeable electrochem. cells)

TI Phosphate additives for nonaqueous electrolyte rechargeable electrochemical cells

AB A lithium ion electrochem. cell having high charge/discharge capacity, long cycle life and exhibiting a reduced first cycle irreversible capacity, is disclosed. The stated benefits are realized by the addn. of at least one phosphate additive having the formula:  $(R_1O)P(=O)(OR_2)(OR_3)$  and wherein  $R_1$ ,  $R_2$  and  $R_3$  are the same or different, wherein at least one, but not all three, of the R groups is hydrogen, or at least one of the R groups has at least 3 carbon atoms and contains an sp or sp<sup>2</sup> hybridized carbon atom bonded to an sp<sup>3</sup> hybridized carbon atom bonded to the oxygen atom bonded to the phosphorous atom.

L18 ANSWER 6 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2003:437558 CAPLUS

DOCUMENT NUMBER: 139:216870

TITLE: Cycling performance of low-cost lithium ion batteries with natural graphite and LiFePO<sub>4</sub>

AUTHOR(S): Shim, Joongpyo; Striebel, Kathryn A.

CORPORATE SOURCE: Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory, Berkeley, CA, 94720, USA

SOURCE: Journal of Power Sources (2003), 119-121, 955-958

CODEN: JPSODZ; ISSN: 0378-7753

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

IT Secondary batteries

(cycling performance of low-cost lithium-ion batteries with natural graphite anode and **lithium iron phosphate** cathode)

IT 7782-42-5, Graphite, uses

RL: DEV (Device component use); USES (Uses)

(anode; cycling performance of low-cost lithium-ion batteries with natural graphite anode and **lithium iron phosphate** cathode)

IT 15365-14-7, **Iron lithium phosphate** (FeLiPO<sub>4</sub>)

RL: DEV (Device component use); USES (Uses)

(cathode; cycling performance of low-cost lithium-ion batteries with natural graphite anode and **lithium iron phosphate** cathode)

TI Cycling performance of low-cost lithium ion batteries with natural

graphite and LiFePO<sub>4</sub>

AB Low-cost lithium-ion batteries with LiFePO<sub>4</sub> cathode and natural graphite anode were cycled in electrolyte contg. 1M LiBF<sub>4</sub>, ethylene carbonate, and di-Et carbonate at 100% depth of discharge and 25.degree. in order to investigate cycle performance and diagnostics for capacity fading. The 12 cm<sup>2</sup> pouch cell showed 65% of capacity retention at 5C compared to that at C/25. The cell showed 80% of initial capacity after 80 cycles and its capacity fade rate was 11.3 .mu.A-h/cycle during const. C/2 cycling. In hybrid pulse power characterization, the discharge resistance of this cell was higher than com. graphite/LiCoO<sub>2</sub> cell because of low lithium diffusivity in LiFePO<sub>4</sub>. Slow rate cycling in pouch full cell showed almost 40% of capacity fade after 100 cycles. However, the cathode and anode after 100 cycles did not show any capacity fading in half-cell test after disassembling full cell, suggesting that capacity fade in the full cell is caused by loss of cycleable Li.

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L18 ANSWER 7 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2003:437557 CAPLUS

DOCUMENT NUMBER: 139:216869

TITLE: LiFePO<sub>4</sub>/gel/natural graphite cells for the BATT program

AUTHOR(S): Striebel, K.; Guerfi, A.; Shim, J.; Armand, M.; Gauthier, M.; Zaghib, K.

CORPORATE SOURCE: Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory, Berkeley, CA, 94720, USA

SOURCE: Journal of Power Sources (2003), 119-121, 951-954

CODEN: JPSODZ; ISSN: 0378-7753

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

IT Secondary batteries

(cycle and calendar life detn. of batteries with **lithium iron phosphate** cathode and natural graphite anode)

IT 7782-42-5, Graphite, uses

RL: DEV (Device component use); USES (Uses)

(anode; cycle and calendar life detn. of batteries with **lithium iron phosphate** cathode and natural graphite anode)

IT 15365-14-7, **Iron lithium phosphate** (FeLiPO<sub>4</sub>)

RL: DEV (Device component use); USES (Uses)

(cathode; cycle and calendar life detn. of batteries with **lithium iron phosphate** cathode and natural graphite anode)

TI LiFePO<sub>4</sub>/gel/natural graphite cells for the BATT program

AB LiFePO<sub>4</sub>/gel/natural graphite (NG) batteries have been prepd. and cycled under a fixed protocol for cycle and calendar life detn. Battery compression of 68 kPa was found to represent an optimal balance between battery impedance and the first cycle losses on the individual electrodes with the gel electrolyte. Cells with a Li anode showed capacities of 160 and 78 mA-h/g LiFePO<sub>4</sub> for C/25 and 2C discharge rates, resp. Rapid capacity and power fade were obsd. in the LiFePO<sub>4</sub>/gel/NG batteries during cycling and calendar life studies. Diagnostic evaluations point to the consumption of cycleable Li by a side reaction as the reason for performance fade with minimal degrdn. of the individual electrodes.

REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L18 ANSWER 8 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2003:413937 CAPLUS

DOCUMENT NUMBER: 138:404345

TITLE: Battery structures, self-organizing structures and

related methods  
INVENTOR(S): Chiang, Yet Ming; Moorehead, William Douglas; Gozdz, Antoni S.; Holman, Richard K.; Loxley, Andrew; Riley, Gilbert N.; Viola, Michael S.  
PATENT ASSIGNEE(S): Al23systems, Inc., USA  
SOURCE: U.S. Pat. Appl. Publ., 70 pp., Cont.-in-part of U.S. Ser. No. 21,740.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 3  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2003099884	A1	20030529	US 2002-206662	20020726
US 2003082446	A1	20030501	US 2001-21740	20011022
PRIORITY APPLN. INFO.:			US 2001-308360P	P 20010727
			US 2001-21740	A2 20011022
			US 2000-242124P	P 20001020

IT Battery anodes  
Battery cathodes  
Coating process  
Embossing  
(battery structures, self-organizing structures and related methods)

IT Fluoropolymers, uses  
Glass, uses  
Polyamines  
Polyimides, uses  
Polyoxyalkylenes, uses  
RL: DEV (Device component use); USES (Uses)  
(battery structures, self-organizing structures and related methods)

IT Polymers, uses  
RL: DEV (Device component use); USES (Uses)  
(block, Li salt-doped; battery structures, self-organizing structures and related methods)

IT Primary batteries  
(lithium; battery structures, self-organizing structures and related methods)

IT Intercalation compounds  
RL: DEV (Device component use); USES (Uses)  
(lithium; battery structures, self-organizing structures and related methods)

IT Azines  
Group VA element compounds  
RL: DEV (Device component use); USES (Uses)  
(phosphazines; battery structures, self-organizing structures and related methods)

IT 7439-95-4, Magnesium, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(CoLiO2 doped with; battery structures, self-organizing structures and related methods)

IT 7440-03-1, Niobium, uses 7440-25-7, Tantalum, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 12042-37-4, AlLi  
RL: MOA (Modifier or additive use); USES (Uses)  
(LiFePO4 doped with; battery structures, self-organizing structures and related methods)

IT 7429-90-5, Aluminum, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(LiMnO2 doped with; battery structures, self-organizing structures and related methods)

IT 68-12-2, Dmf, uses 75-11-6, Diiodomethane 96-49-1, Ethylene carbonate

105-58-8, DiEthyl carbonate 108-32-7, Propylene carbonate 616-38-6, DimEthyl carbonate 627-31-6, 1,3-Diiodopropane 1307-96-6, Cobalt monoxide, uses 1313-13-9, Manganese dioxide, uses 1313-99-1, Nickel oxide (NiO), uses 1314-62-1, Vanadia, uses 1317-34-6, Manganese oxide  $\text{mn}_2\text{o}_3$  1317-35-7, Manganese oxide  $\text{mn}_3\text{o}_4$  1335-25-7, Lead oxide 1343-98-2, Silicon hydroxide 1344-43-0, Manganese oxide  $\text{mno}$ , uses 1345-25-1, Iron oxide  $\text{feo}$ , uses 7226-23-5 7439-93-2, Lithium, uses 7439-93-2D, Lithium, intercalation compd. 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-31-5, Tin, uses 7440-36-0, Antimony, uses 7440-42-8, Boron, uses 7440-44-0, Carbon, uses 7440-56-4, Germanium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7631-86-9, Silicon oxide, uses **7782-42-5**, Graphite, uses 9003-53-6, Polystyrene 10043-35-3, Boric acid ( $\text{H}_3\text{BO}_3$ ), uses 10361-43-0, Bismuth hydroxide 12002-78-7 12031-65-1, Lithium nickel oxide  $\text{linio}_2$  12037-30-8, Vanadium oxide  $\text{v}_6\text{o}_{11}$  12048-27-0, Bili 12057-17-9, Lithium manganese oxide  $\text{limn}_2\text{o}_4$  12057-22-6,  $\text{LiZn}$  12057-30-6 12057-33-9 12063-07-9, Iron lithium oxide  $\text{fe}_2\text{lio}_4$  12162-79-7, Lithium manganese oxide  $\text{limno}_2$  12190-79-3, Cobalt lithium oxide  $\text{colio}_2$  12253-44-0 12338-02-2 12651-23-9, Titanium hydroxide 13463-67-7, Titanium oxide, uses 14475-63-9, Zirconium hydroxide  $\text{Zr}(\text{OH})_4$  15365-14-7, **Iron lithium phosphate**  $\text{felipo}_4$  18282-10-5, Tin dioxide 21651-19-4, Tin oxide  $\text{sno}$  24937-79-9, Polyvinylidene fluoride 25014-41-9, Polyacrylonitrile 25322-68-3, Peo 25322-69-4, Polypropylene oxide 37217-08-6, Lithium titanium oxide  $\text{liti}_2\text{o}_4$  39345-91-0, Lead hydroxide 53262-48-9 55575-96-7, Lithium silicide  $\text{Li}_3\text{Si}_4$  55608-41-8 56627-44-2 61812-08-6, Lithium silicide  $\text{Li}_2\text{Si}_8$  66403-10-9, Lithium boride  $\text{Li}_5\text{B}_4$  67070-82-0 71012-86-7, Lithium boride  $\text{Li}_7\text{B}_6$  74083-26-4 76036-33-4, Lithium silicide  $\text{Li}_2\text{Si}_7$  106494-93-3, Lithium silicide  $\text{Li}_2\text{Si}_5$  114778-10-8, Iron lithium sulfate  $\text{Fe}_2\text{Li}_2(\text{SO}_4)_3$  144419-56-7, Cobalt lithium magnesium oxide  $\text{Co}_{0.95}\text{LiMg}_{0.05}\text{O}_2$  496816-56-9 496816-58-1, **Iron lithium zirconium phosphate**  $\text{Fe}_{0.98}\text{LiZr}_{0.02}(\text{PO}_4)$  531493-25-1, **Iron lithium titanium phosphate** ( $\text{Fe}_{0.98}\text{LiTi}_{0.02}(\text{PO}_4)$ )

RL: DEV (Device component use); USES (Uses)

(battery structures, self-organizing structures and related methods)

IT 99742-70-8, Poly(o-methoxyaniline) 104934-51-2, Poly(3-octylthiophene)

RL: MOA (Modifier or additive use); USES (Uses)

(battery structures, self-organizing structures and related methods)

IT 1303-86-2, Boron oxide ( $\text{B}_2\text{O}_3$ ), uses 1304-76-3, Bismuth oxide ( $\text{Bi}_2\text{O}_3$ ), uses 1314-23-4, Zirconium oxide, uses 1314-56-3, Phosphorus oxide ( $\text{P}_2\text{O}_5$ ), uses 1317-36-8, Lead oxide ( $\text{PbO}$ ), uses 7447-41-8, Lithium chloride, uses 7789-24-4, Lithium fluoride, uses 10377-51-2, Lithium iodide 12057-24-8, Lithia, uses

RL: DEV (Device component use); USES (Uses)

(glass; battery structures, self-organizing structures and related methods)

TI Battery structures, self-organizing structures and related methods

AB An energy storage device includes a first electrode comprising a first material and a second electrode comprising a second material, at least a portion of the first and second materials forming an interpenetrating network when dispersed in an electrolyte, the electrolyte, the first material and the second material are selected so that the first and second materials exert a repelling force on each other when combined. An electrochem. device, includes a first electrode in elec. communication with a first current collector; a second electrode in elec. communication with a second current collector; and an ionically conductive medium in ionic contact with the first and second electrodes, wherein at least a portion of the first and second electrodes form an interpenetrating network and wherein at least one of the first and second electrodes comprises an electrode structure providing two or more pathways to its current collector.

L18 ANSWER 9 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2003:118181 CAPLUS

DOCUMENT NUMBER: 138:156304

TITLE: Battery structures, self-organizing structures, and related methods

INVENTOR(S): Chiang, Yet-Ming; Moorehead, William Douglas; Holman, Richard K.; Viola, Michael S.; Gozdz, Antoni S.; Loxley, Andrew; Riley, Gilbert N., Jr.

PATENT ASSIGNEE(S): Massachusetts Institute of Technology, USA

SOURCE: PCT Int. Appl., 138 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 3

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003012908	A2	20030213	WO 2002-US23880	20020726
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
US 2003082446	A1	20030501	US 2001-21740	20011022
PRIORITY APPLN. INFO.:			US 2001-308360P	P 20010727
			US 2001-21740	A 20011022
			US 2000-242124P	P 20001020
IT	Phosphazenes			
	RL: DEV (Device component use); USES (Uses)			
	((methoxyethoxy)ethoxy; battery structures, self-organizing structures, and related methods)			
IT	Battery anodes			
	Battery cathodes			
	Conducting polymers			
	Embossing			
	Encapsulants			
	Ink-jet printing			
	Lithography			
	Polymer electrolytes			
	Primary batteries			
	Screen printing			
	(battery structures, self-organizing structures, and related methods)			
IT	Fluoropolymers, uses			
	Polyamines			
	Polyimides, uses			
	Polyoxyalkylenes, uses			
	RL: DEV (Device component use); USES (Uses)			
	(battery structures, self-organizing structures, and related methods)			
IT	Polyesters, uses			
	RL: TEM (Technical or engineered material use); USES (Uses)			
	(battery structures, self-organizing structures, and related methods)			
IT	Polyesters, uses			
	RL: TEM (Technical or engineered material use); USES (Uses)			
	(battery structures, self-organizing structures, and related methods)			
IT	Glass, uses			
	RL: DEV (Device component use); USES (Uses)			

(bismuth lithium borate; battery structures, self-organizing structures, and related methods)

IT Polymers, uses  
 RL: DEV (Device component use); USES (Uses)  
 (block, lithium salt-doped, electrolyte; battery structures, self-organizing structures, and related methods)

IT Electric apparatus  
 (electrochem.; battery structures, self-organizing structures, and related methods)

IT Polyoxyalkylenes, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (lithium complexes, perchlorate- or triflate-contg.; battery structures, self-organizing structures, and related methods)

IT Secondary batteries  
 (lithium; battery structures, self-organizing structures, and related methods)

IT Composites  
 (nanocomposite; battery structures, self-organizing structures, and related methods)

IT Printing (nonimpact)  
 (stenciling; battery structures, self-organizing structures, and related methods)

IT Molding  
 (tape-casting; battery structures, self-organizing structures, and related methods)

IT Coating process  
 (web; battery structures, self-organizing structures, and related methods)

IT 7439-95-4, Magnesium, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (CoLiO2 doped with; battery structures, self-organizing structures, and related methods)

IT 7440-03-1, Niobium, uses 7440-25-7, Tantalum, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (FeLiPO4 doped with; battery structures, self-organizing structures, and related methods)

IT 7429-90-5, Aluminum, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (LiMnO2 doped with; battery structures, self-organizing structures, and related methods)

IT 68-12-2, n,n-Dimethylformamide, uses 75-11-6, Diiodomethane 96-49-1, Ethylene carbonate 105-58-8, DiEthyl carbonate 108-32-7, Propylene carbonate 616-38-6, DimEthyl carbonate 627-31-6, 1,3-Diiodopropane 1307-96-6, Cobalt oxide coo, uses 1313-13-9, Manganese oxide mno2, uses 1313-99-1, Nickel oxide nio, uses 1314-23-4, Zirconium oxide, uses 1314-62-1, Vanadia, uses 1317-34-6, Manganese oxide mn2o3 1317-35-7, Manganese oxide mn3o4 1335-25-7, Lead oxide 1344-43-0, Manganese oxidemno, uses 1345-25-1, Iron oxide feo, uses 7226-23-5 7439-93-2, Lithium, uses 7439-93-2D, Lithium, intercalation compd. 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-31-5, Tin, uses 7440-36-0, Antimony, uses 7440-42-8, Boron, uses 7440-44-0, Carbon, uses 7440-56-4, Germanium, uses 7440-66-6, Zinc, uses 7440-69-9, Bismuth, uses 7782-42-5, Graphite, uses 9002-84-0, Ptfе 9003-53-6, Polystyrene 10361-43-0, Bismuth hydroxide 12002-78-7 12031-65-1, Lithium nickel oxide linio2 12037-30-8, Vanadium oxide v6o11 12042-37-4, Alli 12048-27-0, Bili 12057-17-9, Lithium manganese oxide limn2o4 12057-22-6, Lizn 12057-30-6 12057-33-9 12063-07-9, Iron lithium oxide fe2lio4 12162-79-7, Lithium manganese oxide limno2 12190-79-3, Cobalt lithium oxide colio2 12253-44-0 12338-02-2 12651-23-9, Titanium hydroxide 13463-67-7, Titanium oxide, uses 14475-63-9, Zirconium hydroxide 15365-14-7, **Iron**



**lithium phosphate** felipo4 18282-10-5, Tin dioxide  
 21324-40-3, Lithium hexafluorophosphate 21651-19-4, Tin oxide sno  
 24937-79-9, Polyvinylidene fluoride 25014-41-9, Polyacrylonitrile  
 25322-68-3, Peo 25322-69-4, Polypropylene oxide 37217-08-6, Lithium  
 titanium oxide liti2o4 39345-91-0, Lead hydroxide 50851-57-5  
 53262-48-9 53640-36-1 55575-96-7, Lithium silicide Li13Si4  
 55608-41-8 56627-44-2 61812-08-6, Lithium silicide Li21Si8  
 66403-10-9, Lithium boride (Li5B4) 67070-82-0 71012-86-7, Lithium  
 boride (Li7B6) 74083-26-4 76036-33-4, Lithium silicide Li12Si7  
 106494-93-3, Lithium silicide Li21Si5 126213-51-2, Poly(3,4-  
 ethylenedioxythiophene) 136511-06-3, MEEP 144419-56-7, Cobalt lithium  
 magnesium oxide Co0.95LiMg0.05O2 496816-56-9 496816-57-0, Cobalt  
 lithium magnesium oxide (Co0.95Li0.95Mg0.05O1.9) 496816-58-1,  
**Iron lithium zirconium phosphate**  
 (Fe0.98LiZr0.02(PO4))  
 RL: DEV (Device component use); USES (Uses)  
 (battery structures, self-organizing structures, and related methods)  
 IT 76-05-1, Trifluoroacetic acid, uses 104-15-4, Toluene sulfonic acid,  
 uses 7647-01-0, Hydrochloric acid, uses 57534-41-5, Zonyl FSN  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (battery structures, self-organizing structures, and related methods)  
 IT 9002-88-4, Polyethylene 11099-11-9, Vanadium oxide  
 25038-59-9, Mylar, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (battery structures, self-organizing structures, and related methods)  
 IT 99742-70-8, Poly(o-methoxyaniline) 104934-51-2, Poly(3-octylthiophene)  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (coating; battery structures, self-organizing structures, and related  
 methods)  
 IT 7440-50-8, Copper, uses  
 RL: DEV (Device component use); USES (Uses)  
 (current collector; battery structures, self-organizing structures, and  
 related methods)  
 IT 7791-03-9, Lithium perchlorate 33454-82-9, Lithium triflate  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (electrolyte, cog. polyethylene oxide; battery structures,  
 self-organizing structures, and related methods)  
 IT 1303-86-2, Boron oxide b2o3, uses 1304-76-3, Bismuth oxide bi2o3, uses  
 1314-56-3, Phosphorus pentoxide, uses 1317-36-8, Lead oxide pbo, uses  
 7447-41-8, Lithium chloride, uses 7631-86-9, Silica, uses 7789-24-4,  
 Lithium fluoride, uses 10377-51-2, Lithium iodide 12057-24-8, Lithia,  
 uses  
 RL: DEV (Device component use); USES (Uses)  
 (glass; battery structures, self-organizing structures, and related  
 methods)  
 IT 7439-93-2D, Lithium, polyethylene oxide complexes 25322-68-3D, Peo,  
 lithium complexes  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (perchlorate- or triflate-contg.; battery structures, self-organizing  
 structures, and related methods)  
 TI Battery structures, self-organizing structures, and related methods  
 AB An energy storage device includes a first electrode comprising a first  
 material and a second electrode comprising a second material, at least a  
 portion of the first and second materials forming an interpenetrating  
 network when dispersed in an electrolyte, the electrolyte, the first  
 material and the second material are selected so that the first and second  
 materials exert a repelling force on each other when combined. An  
 electrochem. device, includes a first electrode in elec. communication  
 with a first current collector; a second electrode in elec. communication  
 with a second current collector; and an ionically conductive medium in  
 ionic contact with the first and second electrodes, wherein at least a  
 portion of the first and second electrodes form an interpenetrating

network and wherein at least one of the first and second electrodes comprises an electrode structure providing two or more pathways to its current collector.

L18 ANSWER 10 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2003:97868 CAPLUS

DOCUMENT NUMBER: 138:140078

TITLE: Alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials

INVENTOR(S): Barker, Jeremy; Saidi, M. Yazid; Swoyer, Jeffrey L.

PATENT ASSIGNEE(S): UK

SOURCE: U.S. Pat. Appl. Publ., 22 pp., Cont.-in-part of U.S. 6,387,568.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 3

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2003027049	A1	20030206	US 2001-14822	20011026
US 6387568	B1	20020514	US 2000-559861	20000427
TW 503596	B	20020921	TW 2001-90109979	20010426
US 2002168573	A1	20021114	US 2002-133091	20020426
WO 2003038930	A2	20030508	WO 2002-US33510	20021018
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			

PRIORITY APPLN. INFO.:

US 2000-559861 A2 20000427

US 2001-14822 A 20011026

IT Battery cathodes

Hydrothermal reactions

(alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

IT Chalcogenides

Olivine-group minerals

Oxides (inorganic), uses

RL: DEV (Device component use); USES (Uses)

(alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

IT Carbonaceous materials (technological products)

RL: MOA (Modifier or additive use); USES (Uses)

(alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

IT Reduction

(carbothermal; alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

IT Phosphates, uses

RL: DEV (Device component use); USES (Uses)

(halide; alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

IT Secondary batteries

(lithium; alkali/transition metal halo- and hydroxy-phosphates and

- related electrode active materials)
- IT Halides  
RL: DEV (Device component use); USES (Uses)  
(phosphates; alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)
- IT 7440-44-0, Carbon, uses 7782-42-5, Graphite, uses 77641-62-4, Nasicon  
RL: DEV (Device component use); USES (Uses)  
(alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)
- IT 52934-02-8P, Cobalt lithium fluoride phosphate 52934-08-4P, Lithium nickel fluoride phosphate 257892-19-6P, Sodium vanadium fluoride phosphate (Na<sub>3</sub>V<sub>2</sub>F<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>) 477779-87-6P, Sodium vanadium fluoride phosphate NaVFPO<sub>4</sub> 477779-89-8P, Lithium sodium vanadium fluoride phosphate (Li<sub>0.95</sub>Na<sub>0.05</sub>VF(PO<sub>4</sub>)) 484039-84-1P, Cobalt lithium fluoride phosphate (CoLi<sub>2</sub>F(PO<sub>4</sub>)) 484039-86-3P, **Iron lithium fluoride phosphate** (FeLi<sub>2</sub>F(PO<sub>4</sub>)) 484039-88-5P 484039-91-0P, Lithium nickel fluoride phosphate (Li<sub>2</sub>NiF(PO<sub>4</sub>)) 484039-93-2P, **Iron lithium fluoride phosphate** 484039-95-4P, Lithium manganese fluoride phosphate (Li<sub>2</sub>MnF(PO<sub>4</sub>)) 484039-97-6P, Copper lithium fluoride phosphate (CuLi<sub>2</sub>F(PO<sub>4</sub>)) 484040-01-9P, **Iron lithium magnesium fluoride phosphate** (Fe<sub>0.9</sub>Li<sub>1.25</sub>Mg<sub>0.1</sub>F<sub>0.25</sub>(PO<sub>4</sub>)) 484040-04-2P, Sodium vanadium fluoride phosphate (Na<sub>1.2</sub>VF<sub>1.2</sub>(PO<sub>4</sub>)) 484040-06-4P, Chromium sodium fluoride phosphate 484040-08-6P, Manganese sodium fluoride phosphate (MnNaF(PO<sub>4</sub>)) 484040-10-0P, Cobalt sodium fluoride phosphate (CoNaF(PO<sub>4</sub>)) 484040-12-2P, Lithium sodium vanadium fluoride phosphate (Li<sub>0.1</sub>Na<sub>0.9</sub>VF(PO<sub>4</sub>)) 484040-13-3P, Sodium vanadium hydroxide phosphate NaVOHPO<sub>4</sub> 484040-14-4P, **Iron lithium fluoride phosphate** (Fe<sub>2</sub>Li<sub>4</sub>F(PO<sub>4</sub>)<sub>3</sub>) 484040-15-5P, Lithium vanadium fluoride phosphate (Li<sub>4</sub>V<sub>2</sub>F(PO<sub>4</sub>)<sub>3</sub>) 484040-20-2P, Lithium manganese fluoride phosphate (Li<sub>5</sub>Mn<sub>2</sub>F<sub>2</sub>(PO<sub>4</sub>)<sub>3</sub>) 484040-22-4P, Lithium vanadium fluoride phosphate (Li<sub>6</sub>V<sub>2</sub>F(PO<sub>4</sub>)<sub>3</sub>) 484040-25-7P, Chromium lithium sodium fluoride phosphate silicate (CrLiNa<sub>0.2</sub>F(PO<sub>4</sub>)<sub>0.8</sub>(SiO<sub>4</sub>)<sub>0.2</sub>) 484040-27-9P 484040-28-0P 493025-03-9P, Lithium manganese fluoride phosphate 493025-04-0P, Copper lithium fluoride phosphate  
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)
- TI Alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials
- AB An electroactive material comprises: AaMb(XY<sub>4</sub>)cZd, wherein (a) A is selected from the group consisting of Li, Na, and/or K, and a = 0-8; (b) M is .gtoreq.1 metal, comprising .gtoreq.1 metal which is capable of undergoing oxidn. to a higher valence state, and b = 1-3; (c) XY<sub>4</sub> is selected from the group consisting of X'O<sub>4</sub>-xY'x, X'O<sub>4</sub>-yY'2y, X''S<sub>4</sub>, and mixts. thereof, where X' is P, As, Sb, Si, and/or Ge; X'' is P, As, Sb, Si, and/or Ge; Y' is halogen, x = 0-3; and y = 0-4; and c = 0-3; (d) Z is OH and/or halogen, d = 0-6; and wherein M, X, Y, Z, a, b, c, d, x, and y are selected so as to maintain the electroneutrality of the compd. Preferred embodiments include those having where c=1, those where c=2, and those where c=3. Preferred embodiments include those where a .ltoreq.1 and c=1, those where a=2 and c=1, and those where a.gtreq.3 and c=3. This invention also provides electrodes comprising an electrode active material of this invention, and batteries that comprise a first electrode having an electrode active material of this invention; a second electrode having a compatible active material; and an electrolyte.

TITLE: secondary nonaqueous electrolyte battery  
 INVENTOR(S): Miyaki, Yukio  
 PATENT ASSIGNEE(S): Sony Corporation, Japan  
 SOURCE: PCT Int. Appl., 25 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003007405	A1	20030123	WO 2002-JP7011	20020710
W: CN, KR, US				
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR				
JP 2003031211	A2	20030131	JP 2001-209727	20010710
PRIORITY APPLN. INFO.:			JP 2001-209727	A 20010710
IT	Battery anodes (carbonaceous anodes contg. tin alloys and polymers for secondary lithium batteries)			
IT	Fluoropolymers, uses Styrene-butadiene rubber, uses RL: DEV (Device component use); USES (Uses) (carbonaceous anodes contg. tin alloys and polymers for secondary lithium batteries)			
IT	24937-79-9, Poly(vinylidene fluoride) RL: DEV (Device component use); USES (Uses) (carbonaceous anodes contg. tin alloys and polymers for secondary lithium batteries)			
IT	12190-79-3, Cobalt lithium oxide (CoLiO <sub>2</sub> ) 15365-14-7 253776-82-8, Aluminum cobalt lithium nickel oxide (Al <sub>0.01</sub> Co <sub>0.19</sub> LiNi <sub>0.80</sub> O <sub>2</sub> ) 474902-99-3, <b>Iron lithium manganese phosphate</b> (Fe <sub>0.35</sub> LiMn <sub>0.65</sub> (PO <sub>4</sub> )) RL: DEV (Device component use); USES (Uses) (cathodes in secondary lithium batteries using tin alloy contg. carbonaceous anodes)			
IT	12787-61-0	70993-37-2	489428-73-1	489428-74-2 489428-75-3
	489428-76-4	489428-77-5	489428-78-6	489428-79-7 489428-80-0
	489428-81-1	489428-82-2	489428-83-3	489428-84-4 489428-85-5
	489428-86-6	489428-87-7	489428-88-8	489428-89-9
	RL: DEV (Device component use); USES (Uses) (comps. of tin alloys in carbonaceous anodes for secondary lithium batteries)			
IT	9003-55-8 RL: DEV (Device component use); USES (Uses) (styrene-butadiene rubber, carbonaceous anodes contg. tin alloys and polymers for secondary lithium batteries)			
IT	<b>7782-42-5</b> , Graphite, uses RL: DEV (Device component use); USES (Uses) (synthetic; carbonaceous anodes contg. tin alloys and polymers for secondary lithium batteries)			
TI	secondary nonaqueous electrolyte battery			
AB	A secondary Li battery uses an anode contg. a carbonaceous material, a polymer, and a Sn compd. SnM <sub>x</sub> M' <sub>y</sub> M'' <sub>z</sub> , where M = Co and/or Cu; M' = Cr, Fe, Mn, Nb, Mo, W, B, and/or P; M'' = In, Ag, Zn, and/or Al; 0.1 < x .ltoreq.2, 0 < y .ltoreq.2, and 0 < z .ltoreq.1.			
REFERENCE COUNT:		7	THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT	

DOCUMENT NUMBER: 138:92874  
 TITLE: Alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials  
 INVENTOR(S): Barker, Jeremy; Saidi, M. Yazid; Swoyer, Jeffery L.  
 PATENT ASSIGNEE(S): UK  
 SOURCE: U.S. Pat. Appl. Publ., 22 pp., Cont.-in-part of U. S. 6,387,568.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 3  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2003013019	A1	20030116	US 2001-45685	20011107
US 6387568	B1	20020514	US 2000-559861	20000427
TW 503596	B	20020921	TW 2001-90109979	20010426
US 2002168573	A1	20021114	US 2002-133091	20020426

PRIORITY APPLN. INFO.: US 2000-559861 A2 20000427

IT Battery cathodes  
 NASICONs  
 (alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

IT Carbonaceous materials (technological products)  
 Oxides (inorganic), uses  
 RL: DEV (Device component use); USES (Uses)  
 (alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

IT Secondary batteries  
 (lithium; alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

IT Chalcogenides  
 RL: DEV (Device component use); USES (Uses)  
 (metal; alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

IT 7440-44-0, Carbon, uses **7782-42-5**, Graphite, uses 484039-84-1, Cobalt lithium fluoride phosphate (CoLi<sub>2</sub>F(PO<sub>4</sub>)) 484039-86-3, **Iron lithium fluoride phosphate** (FeLi<sub>2</sub>F(PO<sub>4</sub>)) 484039-88-5  
 RL: DEV (Device component use); USES (Uses)  
 (alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials)

IT 52934-02-8P, Cobalt lithium fluoride phosphate 477779-87-6P, Sodium vanadium fluoride phosphate NaVFPO<sub>4</sub> 484039-91-0P, Lithium nickel fluoride phosphate (Li<sub>2</sub>NiF(PO<sub>4</sub>)) 484039-93-2P, **Iron lithium fluoride phosphate** 484039-95-4P, Lithium manganese fluoride phosphate (Li<sub>2</sub>MnF(PO<sub>4</sub>)) 484039-97-6P, Copper lithium fluoride phosphate (CuLi<sub>2</sub>F(PO<sub>4</sub>)) 484040-01-9P 484040-04-2P, Sodium vanadium fluoride phosphate (Na<sub>1.2</sub>VF<sub>1.2</sub>(PO<sub>4</sub>)) 484040-06-4P, Chromium sodium fluoride phosphate 484040-08-6P, Manganese sodium fluoride phosphate (MnNaF(PO<sub>4</sub>)) 484040-10-0P, Cobalt sodium fluoride phosphate (CoNaF(PO<sub>4</sub>)) 484040-12-2P 484040-13-3P, Sodium vanadium hydroxide phosphate (NaV(OH)(PO<sub>4</sub>)) 484040-14-4P, **Iron lithium fluoride phosphate** (Fe<sub>2</sub>Li<sub>4</sub>F(PO<sub>4</sub>)<sub>3</sub>) 484040-15-5P, Lithium vanadium fluoride phosphate (Li<sub>4</sub>V<sub>2</sub>F(PO<sub>4</sub>)<sub>3</sub>) 484040-20-2P, Lithium manganese fluoride phosphate (Li<sub>5</sub>Mn<sub>2</sub>F<sub>2</sub>(PO<sub>4</sub>)<sub>3</sub>) 484040-22-4P, Lithium vanadium fluoride phosphate (Li<sub>6</sub>V<sub>2</sub>F(PO<sub>4</sub>)<sub>3</sub>) 484040-25-7P 484040-27-9P 484040-28-0P  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
 (alkali/transition metal halo- and hydroxy-phosphates and related

electrode active materials)

TI Alkali/transition metal halo- and hydroxy-phosphates and related electrode active materials

AB Electrode active materials comprise lithium or other alkali metals, a transition metal, a phosphate or similar moiety, and a halogen or hydroxyl moiety. Such electrode actives include those of the formula:  $AaMb(XY_4)_cZ_d$  wherein (a) A is selected from the group consisting of Li, Na, K, and mixts. thereof, and  $0 < a \leq 6$ ; (b) M comprises one or more metals, comprising at least one metal which is capable of undergoing oxidn. to a higher valence state, and  $1 \leq b \leq 3$ ; (c)  $XY_4$  is selected from the group consisting of  $X'O_4-xY'X_x$ ,  $X'O_4-yY'2y$ ,  $X''S_4$ , and mixts. thereof, where X' is P, As, Sb, Si, Ge, S, and mixts. thereof; X'' is P, As, Sb, Si, Ge and mixts. thereof; Y' is halogen;  $0 \leq x < 3$ ; and  $0 < y < 4$ ; and  $0 < c \leq 3$ ; (d) Z is OH, halogen, or mixts. thereof, and  $0 < d \leq 6$ ; and wherein M, X, Y, Z, a, b, c, d, x and y are selected so as to maintain electroneutrality of the compd. In a preferred embodiment, M comprises two or more transition metals from Groups 4 to 11 of the Periodic Table. In another preferred embodiment, M comprises  $M'1-mM''m$ , where M' is at least one transition metal from Groups 4 to 11 of the Periodic Table; M'' is at least one element from Groups 2, 3, 12, 13, or 14 of the Periodic Table, and  $0 < m < 1$ . Preferred embodiments include those having where  $c=1$ , those where  $c=2$ , and those where  $c=3$ . Preferred embodiments include those where  $a \leq 1$  and  $c=1$ , those where  $a=2$  and  $c=1$ , and those where  $a \geq 3$  and  $c=3$ . This invention also provides electrodes comprising an electrode active material of this invention, and batteries that comprise a first electrode having an electrode active material of this invention; a second electrode having a compatible active material; and an electrolyte.

L18 ANSWER 13 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2003:40437 CAPLUS

DOCUMENT NUMBER: 138:109577

TITLE: Solid secondary lithium battery

INVENTOR(S): Ogata, Naoya; Sata, Tsutomu

PATENT ASSIGNEE(S): Torekion K. K., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.  
CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003017121	A2	20030117	JP 2001-200782	20010702
PRIORITY APPLN. INFO.:			JP 2001-200782	20010702
IT Secondary batteries (lithium; compns. and structure of secondary Li batteries contg. Li-intercalating electrodes and solid polymer electrolyte solns.)				
IT <b>7782-42-5</b> , Graphite, uses 12031-95-7, Lithium titanium oxide (Li <sub>4</sub> Ti <sub>5</sub> O <sub>12</sub> ) RL: DEV (Device component use); USES (Uses) (anode; compns. and structure of secondary Li batteries contg. Li-intercalating electrodes and solid polymer electrolyte solns.)				
IT 12190-79-3, Cobalt lithium oxide (CoLiO <sub>2</sub> ) 15365-14-7, <b>Iron lithium phosphate</b> (LiFePO <sub>4</sub> ) RL: DEV (Device component use); USES (Uses) (cathode; compns. and structure of secondary Li batteries contg. Li-intercalating electrodes and solid polymer electrolyte solns.)				
IT 79-10-7D, Acrylic acid, polyoxyalkylene derivs. 115383-11-4 RL: DEV (Device component use); USES (Uses) (compns. and structure of secondary Li batteries contg.				

Li-intercalating electrodes and solid polymer electrolyte solns.)

IT 82113-65-3, Bis(trifluoromethane sulfonyl) imide 90076-65-6  
 RL: DEV (Device component use); USES (Uses)  
 (salt, electrolyte; compns. and structure of secondary Li batteries  
 contg. Li-intercalating electrodes and solid polymer electrolyte  
 solns.)

IT 6222-20-4 486459-47-6  
 RL: DEV (Device component use); USES (Uses)  
 (solvent, electrolyte; compns. and structure of secondary Li batteries  
 contg. Li-intercalating electrodes and solid polymer electrolyte  
 solns.)

TI Solid secondary lithium battery

AB The battery has a Li or Li-intercalating anode, a Li-intercalating  
 cathode, and a solid electrolyte in between; where the electrolyte is a  
 soln. contg. a Li salt in a room temp. solid arom. carbonate. Another  
 type of the battery has a solid polymer electrolyte contg. a crosslinked  
 polyether polymer matrix and the above soln. as continuous phase in the  
 matrix.

L18 ANSWER 14 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:734259 CAPLUS  
 DOCUMENT NUMBER: 137:265592  
 TITLE: secondary lithium battery  
 INVENTOR(S): Fujita, Shigeru; Akashi, Hiroyuki; Adachi, Momoe;  
 Shibamoto, Goro  
 PATENT ASSIGNEE(S): Sony Corp., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002279989	A2	20020927	JP 2001-77086	20010316
PRIORITY APPLN. INFO.:			JP 2001-77086	20010316

IT Battery cathodes  
 (compns. of oxide cathodes for secondary lithium batteries with lithium  
 intercalating and depositing anodes)

IT Battery anodes  
 (lithium intercalating and depositing anodes for secondary lithium  
 batteries with oxide cathodes)

IT Carbonaceous materials (technological products)  
 RL: DEV (Device component use); USES (Uses)  
 (lithium intercalating and depositing anodes for secondary lithium  
 batteries with oxide cathodes)

IT Secondary batteries  
 (lithium; secondary lithium batteries with oxide cathodes and lithium  
 intercalating and depositing anodes)

IT 12057-17-9, Lithium manganese oxide (LiMn2O4) 12190-79-3, Cobalt lithium  
 oxide (CoLiO2) 15365-14-7, **Iron lithium**  
**phosphate** (FeLiPO4) 113066-89-0, Cobalt lithium nickel oxide  
 (Co0.2LiNi0.8O2) 213467-46-0, **Iron lithium** manganese  
**phosphate** [FeLi2Mn(PO4)2]  
 RL: DEV (Device component use); USES (Uses)  
 (compns. of oxide cathodes for secondary lithium batteries with lithium  
 intercalating and depositing anodes)

IT 7429-90-5, Aluminum, uses 7439-92-1, Lead, uses 7439-95-4, Magnesium,  
 uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-31-5,  
 Tin, uses 7440-36-0, Antimony, uses 7440-38-2, Arsenic, uses  
 7440-42-8, Boron, uses 7440-43-9, Cadmium, uses 7440-55-3, Gallium, .

uses 7440-56-4, Germanium, uses 7440-58-6, Hafnium, uses 7440-65-5, Yttrium, uses 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses 7440-69-9, Bismuth, uses 7440-74-6, Indium, uses 7782-42-5, Graphite, uses

RL: DEV (Device component use); USES (Uses)

(lithium intercalating and depositing anodes for secondary lithium batteries with oxide cathodes)

TI secondary lithium battery

AB The battery has a Li intercalating and depositing anode and a oxide cathode active mass contg. Li, P and .gtoreq.1 of Fe, Mn and Co. The cathode may also contain a 2nd oxide active mass contg. Li and .gtoreq.1 of Co, Ni, and Mn. The anode active mass is selected from Li intercalating carbonaceous materials and metals, semiconductors, alloys, and compds. capable of alloying with Li.

L18 ANSWER 15 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:716669 CAPLUS

DOCUMENT NUMBER: 137:250290

TITLE: Cathode compositions and their use, particularly in batteries

INVENTOR(S): Ravet, Nathalie; Armand, Michel

PATENT ASSIGNEE(S): Universite de Montreal, Can.; Centre National de la Recherche Scientifique

SOURCE: PCT Int. Appl., 16 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002073716	A2	20020919	WO 2002-CA341	20020313
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			

PRIORITY APPLN. INFO.: CA 2001-2340798 A 20010313

IT Carbon black, uses

RL: TEM (Technical or engineered material use); USES (Uses)  
(as electronic conductor in battery cathode)

IT Battery cathodes

(compn. and use of)

IT Battery electrolytes

(for cathode consisting of mixed oxide and mixed phosphate)

IT Polyesters, uses

Polyolefins

RL: TEM (Technical or engineered material use); USES (Uses)  
(in battery electrolyte)

IT Primary batteries

Secondary batteries

(with cathode consisting of mixed oxide and mixed phosphate)

IT Lithium alloy, base

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(anode in combination with cathode consisting of mixed oxide and mixed



phosphate)

IT 72785-69-4  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (anode in combination with cathode consisting of mixed oxide and mixed phosphate)

IT 7429-90-5, Aluminum, uses  
 RL: DEV (Device component use); USES (Uses)  
 (as current collector in battery cathode)

IT 7782-42-5, Graphite, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (as electronic conductor in battery cathode)

IT 96-48-0, .gamma.-Butyrolactone 872-50-4, N-Methylpyrrolidone, uses  
 7440-44-0, Carbon, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (coating on battery cathode surface)

IT 7439-93-2, Lithium, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (for anode in combination with cathode consisting of mixed oxide and mixed phosphate)

IT 12022-46-7, Iron lithium oxide (LiFeO<sub>2</sub>) 12031-95-7, Lithium titanium oxide (Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>) 166187-76-4, Lithium manganese oxide (Li<sub>2</sub>Mn<sub>2</sub>O<sub>4</sub>)  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (in anode in combination with cathode consisting of mixed oxide and mixed phosphate)

IT 12057-17-9, Lithium manganese oxide (LiMn<sub>2</sub>O<sub>4</sub>) 12190-79-3, Lithium cobalt oxide (LiCoO<sub>2</sub>) 15365-14-7, **Iron lithium phosphate** (LiFePO<sub>4</sub>)  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (in battery cathodes)

IT 1344-28-1, Alumina, uses 7439-93-2D, Lithium, salts 7631-86-9, Silica, uses 12003-67-7, Lithium aluminate (LiAlO<sub>2</sub>) 13463-67-7, Titania, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (in battery electrolyte)

TI Cathode compositions and their use, particularly in batteries

AB The invention relates to a pos. electrode compn. contg. .gtoreq.1 mixed oxide with a spinel or lamellar structure having general formula Li<sub>1-x</sub>M<sub>1-y</sub>AaO<sub>2-ff</sub>, and .gtoreq.1 mixed phosphate having a general formula Li<sub>1-z</sub>FenMnmPO<sub>4</sub> (where M = Co, Ni, Mn; A = Mg, Zn, Al, Fe, Cr, Co, Mn, Ni, Zn, Ga; 0 .ltoreq. x, y, a, f .ltoreq. 1; 0 .ltoreq. z; n, m .ltoreq. 1) and which operates in the 2.5-4.3 V range with a voltage plateau located between the 2 values.

L18 ANSWER 16 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:409156 CAPLUS

DOCUMENT NUMBER: 136:404301

TITLE: Intermetallic anodes for nonaqueous lithium cells and batteries

INVENTOR(S): Thackeray, Michael M.; Vaughey, John T.; Johnson, Christopher S.; Fransson, Linda M. L.; Edstrom, Ester Kristina; Henriksen, Gary

PATENT ASSIGNEE(S): USA

SOURCE: U.S. Pat. Appl. Publ., 22 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2002064704	A1	20020530	US 2001-8885	20011108
PRIORITY APPLN. INFO.:			US 2000-247404P	P 20001110
IT	Battery anodes (intermetallic anodes for nonaq. lithium cells and batteries)			
IT	Intermetallic compounds RL: DEV (Device component use); USES (Uses) (intermetallic anodes for nonaq. lithium cells and batteries)			
IT	Secondary batteries (lithium; intermetallic anodes for nonaq. lithium cells and batteries)			
IT	7440-02-0, Nickel, uses 7440-50-8, Copper, uses RL: DEV (Device component use); USES (Uses) (current collector; intermetallic anodes for nonaq. lithium cells and batteries)			
IT	7440-44-0, Carbon, uses 7782-42-5, Graphite, uses RL: MOA (Modifier or additive use); USES (Uses) (grain growth inhibitor; intermetallic anodes for nonaq. lithium cells and batteries)			
IT	7439-93-2, Lithium, uses 12031-65-1, Lithium nickel oxide linio2 12057-17-9, Lithium manganese oxide limn2o4 12162-79-7, Lithium manganese oxide limno2 12190-79-3, Cobalt lithium oxide colio2 15365-14-7, <b>Iron lithium phosphate</b> felipo4 RL: DEV (Device component use); USES (Uses) (intermetallic anodes for nonaq. lithium cells and batteries)			
IT	12019-69-1P 428867-64-5P 428867-65-6P 428867-67-8P 428867-69-0P RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses) (intermetallic anodes for nonaq. lithium cells and batteries)			
TI	Intermetallic anodes for nonaqueous lithium cells and batteries			
AB	A method of operating an electrochem. cell is disclosed. The cell has an intermetallic neg. electrode of Cu6-xMxSn5, wherein x is .ltoreq.3 and M is one or more metals including Si and a pos. electrode contg. Li in which Li is shuttled between the pos. electrode and the neg. electrode during charge and discharge to form a lithiated intermetallic neg. electrode during charge. The voltage of the electrochem. cell is controlled during the charge portion of the charge-discharge cycles so that the potential of the lithiated intermetallic neg. electrode in the fully charged electrochem. cell is less than 0.2 V but greater than 0 V vs. metallic lithium.			

L18 ANSWER 17 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:294036 CAPLUS  
DOCUMENT NUMBER: 136:312606  
TITLE: Method of fabrication of high performance lithium or lithium ion batteries  
INVENTOR(S): Dai, Dongli  
PATENT ASSIGNEE(S): E.I. Dupont De Nemours and Company, USA  
SOURCE: PCT Int. Appl., 30 pp.  
CODEN: PIXXD2  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002031905	A2	20020418	WO 2001-US30892	20011003
WO 2002031905	A3	20021003		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,

LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL,  
 PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG,  
 US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM  
 RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,  
 DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF,  
 BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG  
 AU 2002011378 A5 20020422 AU 2002-11378 20011003  
 EP 1328996 A2 20030723 EP 2001-979407 20011003  
 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
 IE, SI, LT, LV, FI, RO, MK, CY, AL, TR  
 US 2003003369 A1 20030102 US 2002-223963 20020820  
 PRIORITY APPLN. INFO.: US 2000-684206 A 20001006  
 US 2000-199700P P 20000426  
 US 2000-205027P P 20000518  
 WO 2001-US30892 W 20011003  
 OTHER SOURCE(S): MARPAT 136:312606  
 IT Ionomers  
 RL: DEV (Device component use); USES (Uses)  
 (fluorinated; method of fabrication of high performance lithium or  
 lithium ion batteries)  
 IT Ionomers  
 RL: DEV (Device component use); USES (Uses)  
 (fluoropolymers, sulfo-contg.; method of fabrication of high  
 performance lithium or lithium ion batteries)  
 IT Polymer electrolytes  
 (gelled; method of fabrication of high performance lithium or lithium  
 ion batteries)  
 IT Fluoropolymers, uses  
 RL: DEV (Device component use); USES (Uses)  
 (ionomers, sulfo-contg.; method of fabrication of high performance  
 lithium or lithium ion batteries)  
 IT Primary batteries  
 Secondary batteries  
 (lithium; method of fabrication of high performance lithium or lithium  
 ion batteries)  
 IT Battery cathodes  
 (method of fabrication of high performance lithium or lithium ion  
 batteries)  
 IT Carbon fibers, uses  
 Polyethers, uses  
 Polyolefins  
 RL: DEV (Device component use); USES (Uses)  
 (method of fabrication of high performance lithium or lithium ion  
 batteries)  
 IT Polymers, uses  
 RL: DEV (Device component use); USES (Uses)  
 (solvent swellable; method of fabrication of high performance lithium  
 or lithium ion batteries)  
 IT 7631-86-9, Fumed silica, uses  
 RL: DEV (Device component use); USES (Uses)  
 (colloidal; method of fabrication of high performance lithium or  
 lithium ion batteries)  
 IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7,  
 Propylene carbonate 616-38-6, Dimethyl carbonate 7782-42-5,  
 Graphite, uses 9011-17-0, Hexafluoropropylene-vinylidene fluoride  
 copolymer 11099-11-9, Vanadium oxide 12031-65-1, Lithium nickel oxide  
 linio2 12057-17-9, Lithium manganese oxide limn2o4 12162-79-7, Lithium  
 manganese oxide limno2 12190-79-3, Cobalt lithium oxide colio2  
 15365-14-7, Iron lithium phosphate felipo4  
 35064-83-6, Perfluoromethyl vinyl ether-vinylidene fluoride copolymer  
 68841-86-1, Perfluoropropyl vinyl ether-vinylidene fluoride copolymer  
 90076-65-6 91891-38-2 135573-53-4, Cobalt lithium nickel oxide

CoO-1LiNiO-102 204450-96-4, Chromium lithium manganese oxide  
412015-20-4

RL: DEV (Device component use); USES (Uses)

(method of fabrication of high performance lithium or lithium ion  
batteries)

IT 84-74-2, Dibutyl phthalate

RL: MOA (Modifier or additive use); USES (Uses)

(method of fabrication of high performance lithium or lithium ion  
batteries)

TI Method of fabrication of high performance lithium or lithium ion batteries

AB Graphite sheeting having a thickness of less than 250 .mu.m and in-plane  
cond. of at least 100 S/cm when employed as a cathode current collector in  
a lithium or lithium ion cell contg. a fluorinated lithium imide or  
methide electrolyte salt imparts high thermal resistance, excellent  
electrochem. stability, and surprisingly high capacity retention at high  
rates of discharge.

L18 ANSWER 18 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:291865 CAPLUS

DOCUMENT NUMBER: 136:312584

TITLE: Method for preparation of cathode active material for  
nonaqueous lithium secondary battery

INVENTOR(S): Sato, Atsushi; Kuyama, Junji; Fukushima, Yuzuru;  
Hosoya, Mamoru

PATENT ASSIGNEE(S): Sony Corp., Japan

SOURCE: Eur. Pat. Appl., 15 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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EP 1198019	A2	20020417	EP 2001-123899	20011005
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2002117847	A2	20020419	JP 2000-308299	20001006
CN 1348226	A	20020508	CN 2001-130348	20010930
US 2002106562	A1	20020808	US 2001-970573	20011004
PRIORITY APPLN. INFO.:			JP 2000-308299	A 20001006

IT Secondary batteries

(lithium; method for prepn. of cathode active material for nonaq.  
lithium secondary battery)

IT Battery cathodes

Battery electrolytes

(method for prepn. of cathode active material for nonaq. lithium  
secondary battery)

IT Fluoropolymers, uses

RL: MOA (Modifier or additive use); USES (Uses)

(method for prepn. of cathode active material for nonaq. lithium  
secondary battery)

IT 10028-23-6, Phosphoric acid, iron(2+) salt (2:3)octahydrate 10377-52-3,

Trilithium phosphate 14940-41-1, Iron phosphate fe3(po4)2 31096-55-6,

Phosphoric acid, iron(2+) salt (2:3) hydrate

RL: CPS (Chemical process); PEP (Physical, engineering or chemical  
process); PROC (Process)

(method for prepn. of cathode active material for nonaq. lithium  
secondary battery)

IT 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate

7782-42-5, Graphite, uses 21324-40-3, Lithium  
hexafluorophosphate

RL: DEV (Device component use); USES (Uses)  
 (method for prepn. of cathode active material for nonaq. lithium  
 secondary battery)

IT 198782-39-7P, **Iron lithium phosphate**  
 (FeLiO-1(PO4))  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (method for prepn. of cathode active material for nonaq. lithium  
 secondary battery)

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 24937-79-9,  
 PvdF  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (method for prepn. of cathode active material for nonaq. lithium  
 secondary battery)

TI Method for preparation of cathode active material for nonaqueous lithium  
 secondary battery

AB A nonaq. electrolyte cell includes a cathode contg. a cathode active  
 material, which is mainly composed of a compd. represented by the general  
 formula  $\text{Li}_x\text{FePO}_4$ , where  $0 < x \leq 1$ , with the molar ratio of  $\text{Li}_3\text{PO}_4$   
 to a compd. represented by the general formula  $\text{Li}_x\text{FePO}_4$ , which ratio is  
 represented by  $\text{Li}_3\text{PO}_4/\text{LiFePO}_4$ , being  $\text{Li}_3\text{PO}_4/\text{LiFePO}_4 \leq 6.67$  times.  
 10-2. Starting materials for the synthesis of compd.  $\text{Li}_x\text{FePO}_4$  where  $0 < x \leq 1$   
 are  $\text{Li}_3\text{PO}_4$  and  $\text{Fe}_3(\text{PO}_4)_2$  or  $\text{Fe}_3(\text{PO}_4)_2 \cdot n\text{H}_2\text{O}$  when  $n$  denotes a no.  
 of hydrates.

L18 ANSWER 19 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:272913 CAPLUS

DOCUMENT NUMBER: 136:297399

TITLE: Nonaqueous electrolyte secondary battery with a  
 compound of an olivinic structure as a cathode active  
 material

INVENTOR(S): Okawa, Tsuyoshi; Hosoya, Mamoru; Kuyama, Junji;  
 Fukushima, Yuzuru

PATENT ASSIGNEE(S): Sony Corporation, Japan

SOURCE: Eur. Pat. Appl., 15 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1195836	A2	20020410	EP 2001-123892	20011005
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2002117833	A2	20020419	JP 2000-308301	20001006
CN 1349266	A	20020515	CN 2001-142412	20010930
US 2002106564	A1	20020808	US 2001-972395	20011005
PRIORITY APPLN. INFO.:			JP 2000-308301	A 20001006

IT Ball milling  
 Battery cathodes  
 Secondary batteries  
 (nonaq. electrolyte secondary battery with compd. of olivinic structure  
 as cathode active material)

IT Carbon black, uses  
 RL: CPS (Chemical process); DEV (Device component use); PEP (Physical,  
 engineering or chemical process); PROC (Process); USES (Uses)  
 (nonaq. electrolyte secondary battery with compd. of olivinic structure  
 as cathode active material)

IT 10377-52-3, Lithium phosphate 13977-75-8, Phosphoric acid, iron(3+) salt  
 (3:2)

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)

(nonaq. electrolyte secondary battery with compd. of olivinic structure as cathode active material)

IT 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 7440-44-0, Carbon, uses 7782-42-5, Graphite, uses 15365-14-7, **Iron lithium phosphate** felipo4 21324-40-3, Lithium hexafluorophosphate 407606-22-8, Chromium **iron lithium phosphate** (Cr0.0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-24-0, Cobalt **iron lithium phosphate** (Co0.0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-26-2, Copper **iron lithium phosphate** (Cu0.0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-28-4, Aluminum **iron lithium phosphate** (Al0.0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-30-8, Gallium **iron lithium phosphate** (Ga0.0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-32-0, Boron **iron lithium phosphate** (B0.0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-36-4, **Iron lithium nickel phosphate** (Fe0.2-1Li0.05-1.2Ni0.0.8(PO4)) 407606-39-7, **Iron lithium vanadium phosphate** (Fe0.2-1Li0.05-1.2V0.0.8(PO4)) 407606-42-2, **Iron lithium molybdenum phosphate** (Fe0.2-1Li0.05-1.2Mo0.0.8(PO4)) 407606-44-4, **Iron lithium titanium phosphate** (Fe0.2-1Li0.05-1.2Ti0.0.8(PO4)) 407606-47-7, **Iron lithium zinc phosphate** (Fe0.2-1Li0.05-1.2Zn0.0.8(PO4)) 407606-49-9, **Iron lithium magnesium phosphate** (Fe0.2-1Li0.05-1.2Mg0.0.8(PO4)) 407606-51-3, **Iron lithium niobium phosphate** (Fe0.2-1Li0.05-1.2Nb0.0.8(PO4)) 407629-83-8 407629-87-2 407629-90-7 407629-95-2 407630-01-7 407630-05-1 407630-10-8 407630-14-2 407630-19-7 407630-25-5, Aluminum **iron lithium phosphate** (Al0.7Fe0.3Li(PO4)) 407630-29-9, Gallium **iron lithium phosphate** (Ga0.7Fe0.3Li(PO4)) 407630-35-7 407630-40-4, Boron **iron lithium phosphate** (B0.75Fe0.25Li(PO4)) 407630-46-0

RL: DEV (Device component use); USES (Uses)

(nonaq. electrolyte secondary battery with compd. of olivinic structure as cathode active material)

IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer

RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)

(nonaq. electrolyte secondary battery with compd. of olivinic structure as cathode active material)

IT 7439-93-2, Lithium, uses

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)

(nonaq. electrolyte secondary battery with compd. of olivinic structure as cathode active material)

TI Nonaqueous electrolyte secondary battery with a compound of an olivinic structure as a cathode active material

AB A non-aq. electrolyte secondary cell contg. a compd. of an olivinic structure as a cathode active material is to be improved in load characteristics and cell capacity. To this end, there is provided a non-aq. electrolyte secondary cell including a cathode having a layer of a cathode active material contg. a compd. represented by the general formula  $\text{Li}_x\text{Fe}_y\text{M}_z\text{PO}_4$ , where M is at least one selected from the group consisting of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb, with 0.05  $\leq x \leq 1.2$  and 0  $\leq y \leq 0.8$ , an anode having a layer of an anode active material and a non-aq. electrolyte, wherein the layer of the cathode active material has a film thickness in a range from 25 to 110  $\mu\text{m}$ . If a layer of a cathode active material is provided on each surface of a cathode current collector, the sum of the film thicknesses of the layers of the cathode active material ranges between 50

and 220 .mu.m. The non-aq. electrolyte may be a liq.-based electrolyte or a polymer electrolyte.

L18 ANSWER 20 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:272908 CAPLUS  
DOCUMENT NUMBER: 136:297394  
TITLE: Solid electrolyte cell  
INVENTOR(S): Goto, Shuji; Hosoya, Mamoru; Endo, Takahiro  
PATENT ASSIGNEE(S): Sony Corporation, Japan  
SOURCE: Eur. Pat. Appl., 16 pp.  
CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1195826	A2	20020410	EP 2001-123774	20011004
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2002117844	A2	20020419	JP 2000-306876	20001005
US 2002094481	A1	20020718	US 2001-966864	20010928
CN 1349273	A	20020515	CN 2001-139323	20010930
PRIORITY APPLN. INFO.:			JP 2000-306876	A 20001005
IT	Polyoxyalkylenes, uses RL: DEV (Device component use); USES (Uses) (lithium complex; solid electrolyte cell)			
IT	Battery cathodes Secondary batteries (solid electrolyte cell)			
IT	Fluoropolymers, uses RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses) (solid electrolyte cell)			
IT	7439-93-2D, Lithium, polyethylene oxide complex 7791-03-9, Lithium perchlorate 12031-65-1, Lithium nickel oxide linio2 12057-17-9, Lithium manganese oxide limn2o4 15365-14-7, <b>Iron lithium phosphate</b> felipo4 25322-68-3D, Polyethylene oxide, lithium complex 116327-69-6, Cobalt lithium nickel oxide Co0.1LiNi0.9O2 147812-18-8, Iron lithium manganese oxide Fe0.05LiMn1.95O4 407606-22-8, Chromium <b>iron lithium phosphate</b> (Cr0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-24-0, Cobalt <b>iron lithium phosphate</b> (Co0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-26-2, Copper <b>iron lithium phosphate</b> (Cu0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-28-4, Aluminum <b>iron lithium phosphate</b> (Al0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-30-8, Gallium <b>iron lithium phosphate</b> (Ga0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-32-0, Boron <b>iron lithium phosphate</b> (B0-0.8Fe0.2-1Li0.05-1.2(PO4)) 407606-34-2, <b>Iron lithium</b> manganese phosphate (Fe0.2-1Li0.05-1.2Mn0-0.8(PO4)) 407606-36-4, <b>Iron lithium nickel phosphate</b> (Fe0.2-1Li0.05-1.2Ni0-0.8(PO4)) 407606-39-7, <b>Iron lithium vanadium phosphate</b> (Fe0.2-1Li0.05-1.2V0-0.8(PO4)) 407606-42-2, <b>Iron lithium molybdenum phosphate</b> (Fe0.2-1Li0.05-1.2Mo0-0.8(PO4)) 407606-44-4, <b>Iron lithium titanium phosphate</b> (Fe0.2-1Li0.05-1.2Ti0-0.8(PO4)) 407606-47-7, <b>Iron lithium zinc phosphate</b> (Fe0.2-1Li0.05-1.2Zn0-0.8(PO4)) 407606-49-9, <b>Iron lithium magnesium phosphate</b> (Fe0.2-1Li0.05-1.2Mg0-0.8(PO4)) 407606-51-3, <b>Iron</b>			

**lithium niobium phosphate** (Fe<sub>0.2</sub>-1Li<sub>0.05</sub>-1.2Nb<sub>0</sub>-0.8(PO<sub>4</sub>)) 408331-94-2, Cobalt lithium nickel oxide ((Co,Ni)LiO-2O<sub>2</sub>) 408331-95-3, Cobalt lithium manganese oxide ((Co,Mn)LiO-2O<sub>2</sub>) 408331-96-4, Cobalt lithium zinc oxide ((Co,Zn)LiO-2O<sub>2</sub>) 408331-97-5, Cobalt lithium tin oxide ((Co,Sn)LiO-2O<sub>2</sub>) 408331-99-7, Cobalt lithium vanadium oxide ((Co,V)LiO-2O<sub>2</sub>) 408332-00-3, Cobalt lithium titanium oxide ((Co,Ti)LiO-2O<sub>2</sub>) 408332-01-4, Cobalt lithium molybdenum oxide ((Co,Mo)LiO-2O<sub>2</sub>) 408332-02-5, Cobalt lithium tungsten oxide ((Co,W)LiO-2O<sub>2</sub>) 408332-03-6, Cobalt lithium magnesium oxide ((Co,Mg)LiO-2O<sub>2</sub>) 408332-04-7, Cobalt lithium strontium oxide ((Co,Sr)LiO-2O<sub>2</sub>) 408332-05-8, Cobalt lithium niobium oxide ((Co,Nb)LiO-2O<sub>2</sub>) 408332-06-9, Cobalt iron lithium oxide ((Co,Fe)LiO-2O<sub>2</sub>) 408332-07-0, Cobalt copper lithium oxide ((Co,Cu)LiO-2O<sub>2</sub>) 408332-08-1, Aluminum cobalt lithium oxide ((Al,Co)LiO-2O<sub>2</sub>) 408332-09-2, Cobalt lithium borate oxide (CoO-1LiO-2(BO<sub>2</sub>)O-1O<sub>2</sub>) 408332-10-5, Cobalt gallium lithium oxide ((Co,Ga)LiO-2O<sub>2</sub>) 408332-11-6, Chromium cobalt lithium oxide ((Cr,Co)LiO-2O<sub>2</sub>) 408332-12-7, Calcium cobalt lithium oxide ((Ca,Co)LiO-2O<sub>2</sub>) 408332-13-8, Iron lithium nickel oxide ((Fe,Ni)LiO-2O<sub>2</sub>) 408332-14-9, Copper lithium nickel oxide ((Cu,Ni)LiO-2O<sub>2</sub>) 408332-15-0, Aluminum lithium nickel oxide ((Al,Ni)LiO-2O<sub>2</sub>) 408332-16-1, Lithium nickel borate oxide (LiO-2NiO-1(BO<sub>2</sub>)O-1O<sub>2</sub>) 408332-17-2, Gallium lithium nickel oxide ((Ga,Ni)LiO-2O<sub>2</sub>) 408332-18-3, Chromium lithium nickel oxide ((Cr,Ni)LiO-2O<sub>2</sub>) 408332-19-4, Calcium lithium nickel oxide ((Ca,Ni)LiO-2O<sub>2</sub>) 408332-20-7, Lithium manganese nickel oxide (LiO-2(Mn,Ni)O<sub>2</sub>) 408332-21-8, Lithium nickel zinc oxide (LiO-2(Ni,Zn)O<sub>2</sub>) 408332-22-9, Lithium nickel tin oxide (LiO-2(Ni,Sn)O<sub>2</sub>) 408332-23-0, Lithium nickel vanadium oxide (LiO-2(Ni,V)O<sub>2</sub>) 408332-24-1, Lithium nickel titanium oxide (LiO-2(Ni,Ti)O<sub>2</sub>) 408332-25-2, Lithium nickel tungsten oxide (LiO-2(Ni,W)O<sub>2</sub>) 408332-26-3, Lithium molybdenum nickel oxide (LiO-2(Mo,Ni)O<sub>2</sub>) 408332-27-4, Lithium magnesium nickel oxide (LiO-2(Mg,Ni)O<sub>2</sub>) 408332-28-5, Lithium nickel strontium oxide (LiO-2(Ni,Sr)O<sub>2</sub>) 408332-29-6, Lithium nickel niobium oxide (LiO-2(Ni,Nb)O<sub>2</sub>) 408332-30-9, Lithium manganese nickel oxide (LiO-2(Mn,Ni)O<sub>2</sub>) 408332-31-0, Lithium manganese zinc oxide (LiO-2(Mn,Zn)O<sub>2</sub>) 408332-32-1, Lithium manganese tin oxide (LiO-2(Mn,Sn)O<sub>2</sub>) 408332-33-2, Lithium manganese vanadium oxide (LiO-2(Mn,V)O<sub>2</sub>) 408332-34-3, Lithium manganese titanium oxide (LiO-2(Mn,Ti)O<sub>2</sub>) 408332-35-4, Lithium manganese molybdenum oxide (LiO-2(Mn,Mo)O<sub>2</sub>) 408332-36-5, Lithium manganese tungsten oxide (LiO-2(Mn,W)O<sub>2</sub>) 408332-37-6, Lithium magnesium manganese oxide (LiO-2(Mg,Mn)O<sub>2</sub>) 408332-38-7, Lithium manganese strontium oxide (LiO-2(Mn,Sr)O<sub>2</sub>) 408332-39-8, Lithium manganese niobium oxide (LiO-2(Mn,Nb)O<sub>2</sub>) 408332-40-1, Iron lithium manganese oxide ((Fe,Mn)2LiO-2O<sub>4</sub>) 408332-42-3, Cobalt lithium manganese oxide ((Co,Mn)2LiO-2O<sub>4</sub>) 408332-44-5, Aluminum lithium manganese oxide ((Al,Mn)2LiO-2O<sub>4</sub>) 408332-45-6, Lithium manganese borate oxide (LiO-2MnO-2(BO<sub>2</sub>)O-2O<sub>2</sub>) 408332-46-7, Gallium lithium manganese oxide ((Ga,Mn)2LiO-2O<sub>4</sub>) 408332-47-8, Chromium lithium manganese oxide ((Cr,Mn)2LiO-2O<sub>4</sub>) 408332-48-9, Calcium lithium manganese oxide ((Ca,Mn)2LiO-2O<sub>4</sub>) 408332-58-1, Aluminum cobalt lithium nickel oxide (Al<sub>0.01</sub>Co<sub>0.98</sub>LiNi<sub>0.01</sub>O<sub>2</sub>) 412351-36-1, **Iron lithium manganese phosphate** (Fe<sub>0.9</sub>LiMn<sub>0.1</sub>(PO<sub>4</sub>))

RL: DEV (Device component use); USES (Uses)

(solid electrolyte cell)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 7782-42-5, Graphite, uses 12190-79-3, Cobalt lithium oxide colio<sub>2</sub> 21324-40-3, Lithium hexafluorophosphate 24937-79-9, Pvd<sub>f</sub> RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)

(solid electrolyte cell)

TI Solid electrolyte cell

AB A solid electrolyte cell in which cell characteristics are not



deteriorated even on overdischarge to the cell voltage of 0 V, such that the shape of the cell encapsulated in the laminate film is maintained. The cell includes a cathode contg. a compd. represented by the general formula  $\text{Li}_x\text{Fe}_{1-y}\text{M}_y\text{PO}_4$  where  $0.05 \leq x \leq 1.2$ ,  $0 \leq y \leq 0.8$ , and M is at least one selected from the group consisting of Mn, Cr, Co, Cu, Ni, V, Mo, Ti, Zn, Al, Ga, Mg, B and Nb, an anode and a solid electrolyte. An electrode unit 1 comprised of the cathode and the anode layered together with interposition of the solid electrolyte is encapsulated with a laminate film 2.

L18 ANSWER 21 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:256645 CAPLUS

DOCUMENT NUMBER: 136:297382

TITLE: Carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes

INVENTOR(S): Armand, Michel; Gauthier, Michel; Magnan, Jean-Francois; Ravet, Nathalie

PATENT ASSIGNEE(S): Hydro-Quebec, Can.

SOURCE: PCT Int. Appl., 78 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 2

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2002027824	A1	20020404	WO 2001-CA1350	20010921
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG			
AU 2001093569	A5	20020408	AU 2001-93569	20010921
EP 1325526	A1	20030709	EP 2001-973907	20010921
R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR			
PRIORITY APPLN. INFO.:			CA 2000-2320661 A	20000926
			WO 2001-CA1350 W	20010921

IT Silanes

RL: RCT (Reactant); RACT (Reactant or reagent)  
(alkoxy, silicon source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)

IT Polyoxyalkylenes, uses

RL: NUU (Other use, unclassified); USES (Uses)  
(alkyl ethers, oligomeric, aprotic solvent; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)

IT Fluoropolymers, uses

Polyesters, uses  
Polyethers, uses  
RL: NUU (Other use, unclassified); USES (Uses)  
(binders; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)

IT Battery cathodes

Battery electrodes

Redox agents  
(carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)

IT Transition metals, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(electrodes contg.; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)

IT 78-93-3, Methyl ethyl ketone, uses 96-48-0, Butyrolactone 96-49-1, Ethylene carbonate 107-21-1D, Ethylene glycol, alkyl ethers 108-32-7, Propylene carbonate 111-46-6D, Diethylene glycol, alkyl ethers 112-27-6D, Triethylene glycol, alkyl ethers 112-60-7D, Tetraethylene glycol, alkyl ethers 463-79-6D, Carbonic acid, C1-4-alkyl esters  
RL: NUU (Other use, unclassified); USES (Uses)  
(aprotic solvent; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)

IT 9011-14-7, Poly(methyl methacrylate) 24937-79-9, Poly(vinylidene difluoride) 25014-41-9, Polyacrylonitrile  
RL: NUU (Other use, unclassified); USES (Uses)  
(bindings; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)

IT 50-99-7, Glucose, reactions 57-48-7, Fructose, reactions 57-50-1, Sucrose, reactions 58-86-6, Xylose, reactions 87-79-6, Sorbose  
**9002-88-4**, Polyethylene **9003-07-0**, Polypropylene  
9004-34-6, Cellulose, reactions 9004-34-6D, Cellulose, esters  
9004-35-7, Cellulose acetate 9005-25-8, Starch, reactions 25212-86-6, Poly(furfuryl alcohol) 43094-71-9, Ethylene-ethylene oxide copolymer  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(carbon source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)

IT 407640-63-5, **Iron lithium titanium phosphate** sulfate ( $\text{Fe}_{0.85}\text{Li}_{1.35}\text{Ti}_{0.15}(\text{PO}_4)_0.5(\text{SO}_4)$ )  
RL: DEV (Device component use); USES (Uses)  
(electrodes contg.; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)

IT 7439-89-6D, Iron, mixed oxides 7439-96-5D, Manganese, mixed oxides 7440-02-0D, Nickel, mixed oxides 7440-32-6D, Titanium, mixed oxides 7440-47-3D, Chromium, mixed oxides 7440-48-4D, Cobalt, mixed oxides 7440-50-8D, Copper, mixed oxides 7440-62-2D, Vanadium, mixed oxides 13816-45-0, Triphylite 15365-14-7, **Iron lithium phosphate** ( $\text{FeLiPO}_4$ ) 213467-46-0, **Iron lithium manganese phosphate** ( $\text{FeLi}_2\text{Mn}(\text{PO}_4)_2$ )  
RL: TEM (Technical or engineered material use); USES (Uses)  
(electrodes contg.; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)

IT 90076-65-6  
RL: NUU (Other use, unclassified); USES (Uses)  
(electrolyte contg.; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)

IT 516-03-0, Ferrous oxalate  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(iron source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)

IT 7429-90-5, Aluminum, uses 7440-31-5, Tin, uses 7440-36-0, Antimony, uses 7440-66-6, Zinc, uses **7782-42-5**, Graphite, uses 39302-37-9, Lithium titanate 207803-50-7, Aluminum cobalt lithium magnesium nickel oxide 258511-24-9, Iron lithium nitride 263898-18-6, Cobalt manganese nitride 407640-62-4  
RL: DEV (Device component use); USES (Uses)  
(lithium-based cathodes contg.; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)

- IT 638-38-0, Manganese(II) acetate  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (manganese source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)
- IT 546-89-4, Lithium acetate 553-91-3, Lithium oxalate 554-13-2, Lithium carbonate 1309-37-1, Ferric oxide, reactions 1310-65-2, Lithium hydroxide 1313-13-9, Manganese dioxide, reactions 1314-62-1, Vanadium pentoxide, reactions 1317-61-9, Magnetite, reactions 10045-86-0, Ferric phosphate 10102-24-6, Lithium silicate ( $\text{Li}_2\text{SiO}_3$ ) 10377-48-7, Lithium sulfate 10377-52-3, Lithium phosphate ( $\text{Li}_3\text{PO}_4$ ) 10421-48-4, Ferric nitrate 12057-24-8, Lithium oxide, reactions 12627-14-4 13453-80-0, Lithium dihydrogen phosphate 63985-45-5, Lithium orthosilicate 407640-52-2, **Iron lithium manganese phosphate** ( $\text{Fe}_{0.1}\text{-LiMn}_{0.9}(\text{PO}_4)$ ) 407640-53-3, **Iron lithium magnesium phosphate** ( $\text{Fe}_{0.7}\text{-LiMg}_{0.3}(\text{PO}_4)$ ) 407640-54-4, Calcium **iron lithium phosphate** ( $\text{Ca}_{0.3}\text{Fe}_{0.7}\text{-Li}(\text{PO}_4)$ ) 407640-55-5 407640-56-6, **Iron lithium phosphate** silicate ( $\text{FeLi}_{1.9}(\text{PO}_4)0.1\text{-}(\text{SiO}_4)0.9$ ) 407640-57-7 407640-58-8, **Iron lithium manganese phosphate** sulfate ( $\text{Fe}_{0.1}\text{Li}_{1.9}\text{-}1.2\text{Mn}_{0.9}[(\text{PO}_4), (\text{SO}_4)]$ ) 407640-59-9, **Iron lithium manganese phosphate** ( $(\text{Fe,Mn})\text{Li}_{1.6}(\text{PO}_4)$ ) 407640-60-2, **Iron lithium manganese phosphate** sulfate ( $\text{Fe}_{1.2}\text{Li}_{1.6}\text{-}2\text{Mn}_{0.4}[(\text{PO}_4), (\text{SO}_4)]$ ) 407640-61-3, **Iron lithium titanium phosphate** ( $(\text{Fe,Ti})\text{Li}_{0.5}\text{-}2(\text{PO}_4)1.5$ )  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (metal source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)
- IT 25322-68-3D, Polyethylene glycol, alkyl ethers  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (oligomeric, aprotic solvent; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)
- IT 7664-38-2, Phosphoric acid, reactions 7664-38-2D, Phosphoric acid, esters 7783-28-0, Ammonium hydrogen phosphate 10124-54-6, Manganese phosphate  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (phosphorus source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)
- IT 7631-86-9, Silica, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (silicon source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)
- IT 7664-93-9, Sulfuric acid, reactions 7783-20-2, Ammonium sulfate, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (sulfur source; carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes)
- TI Carbon-coated or carbon-crosslinked redox materials with transition metal-lithium oxide core for use as battery electrodes
- AB Carbon-coated redox materials suitable for use in battery electrodes consist of a core surrounded by a coating, or interconnected by carbon crosslinks, in which the core includes a compn. of formula  $\text{Li}_x\text{M}_{1-y}\text{M}'_y(\text{XO}_4)_n$ , in which  $y = 0\text{-}0.6$ ,  $x = 0\text{-}2$ ,  $n = 0\text{-}1.5$ ; M is a transition metal; and M' is a element of fixed valence selected from  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Al}^{3+}$ , and  $\text{Zn}^{2+}$ , and X is S, P, and Si. Synthesis of the materials is carried out by reacting a balanced mixt. of appropriate precursors in a reducing atm., to adjust the valence of the transition metals, in the presence of a carbon source, which is then pyrolyzed. The resulting products exhibit an excellent elec. cond. and a highly enhanced chem. activity.

REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS

## RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L18 ANSWER 22 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:253129 CAPLUS

DOCUMENT NUMBER: 136:281939

TITLE: Nonaqueous electrolyte battery cathode active material capable of reversibly doping/undoping lithium

INVENTOR(S): Hosoya, Mamoru; Takahashi, Kimio; Fukushima, Yuzuru

PATENT ASSIGNEE(S): Sony Corporation, Japan

SOURCE: Eur. Pat. Appl., 16 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1193787	A2	20020403	EP 2001-123181	20010927
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2002110161	A2	20020412	JP 2000-301399	20000929
US 2002114754	A1	20020822	US 2001-961895	20010924
TW 518781	B	20030121	TW 2001-90123611	20010925
CN 1350341	A	20020522	CN 2001-142556	20010929
PRIORITY APPLN. INFO.:			JP 2000-301399	A 20000929

IT Secondary batteries  
(lithium; nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT Ball milling  
Battery cathodes  
Composites  
Sintering  
(nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT Carbonaceous materials (technological products)  
RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT Fluoropolymers, uses  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT 10028-23-6, Phosphoric acid, iron(2+) salt (2:3) octahydrate 10045-86-0, Ferric phosphate 10377-52-3, Lithium phosphate  $\text{Li}_3\text{PO}_4$  31096-55-6  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)  
(nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 7439-93-2, Lithium, uses 7440-44-0, Carbon, uses **7782-42-5**, Graphite, uses 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 15365-14-7, **Iron lithium phosphate**  $\text{FeLiPO}_4$  21324-40-3, Lithium hexafluorophosphate  
RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT 24937-79-9, PvdF  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte battery cathode active material capable of

reversibly doping/undoping lithium)

IT 198782-39-7P, **Iron lithium phosphate**  
(FeLiO-1(PO4))  
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT 872-36-6, Vinylene carbonate  
RL: MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

TI Nonaqueous electrolyte battery cathode active material capable of reversibly doping/undoping lithium

AB An LiFePO4 carbon composite material is to be synthesized in a single phase to realize superior cell characteristics. To this end, in the prepn. of a cathode active material, starting materials for synthesis of a compd. having the formula  $\text{Li}_x\text{FePO}_4$ , where  $0 < x \leq 1$ , are mixed together, milled and sintered. A carbon material is added at one of these steps. As the starting materials for synthesis for  $\text{Li}_x\text{FePO}_4$ ,  $\text{Li}_3\text{PO}_4$ ,  $\text{Fe}_3\text{PO}_4$ ,  $\text{Fe}_3(\text{PO}_4)_2$  or its hydrate  $\text{Fe}_3(\text{PO}_4)_2 \cdot n\text{H}_2\text{O}$ , where n is the no. of hydrates, are used, and the content of  $\text{Fe}^{3+}$  in the total iron in  $\text{Fe}_3(\text{PO}_4)_2$  or its hydrate  $\text{Fe}_3(\text{PO}_4)_2 \cdot n\text{H}_2\text{O}$  is set to 61 wt% or less.

L18 ANSWER 23 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:253128 CAPLUS  
DOCUMENT NUMBER: 136:281938  
TITLE: Nonaqueous electrolyte battery cathode active material capable of reversibly doping/undoping lithium  
INVENTOR(S): Hosoya, Mamoru; Takahashi, Kimio; Fukushima, Yuzuru  
PATENT ASSIGNEE(S): Sony Corporation, Japan  
SOURCE: Eur. Pat. Appl., 15 pp.  
CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1193786	A2	20020403	EP 2001-123180	20010927
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2002110163	A2	20020412	JP 2000-301401	20000929
US 2002061274	A1	20020523	US 2001-965273	20010927
TW 519776	B	20030201	TW 2001-90123924	20010927
CN 1349265	A	20020515	CN 2001-142532	20010929
PRIORITY APPLN. INFO.:			JP 2000-301401	A 20000929

IT Secondary batteries  
(lithium; nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT Battery cathodes  
Composites  
Sintering  
(nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT Carbon black, uses  
Carbonaceous materials (technological products)  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT Fluoropolymers, uses

RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT Ball milling  
 (planetary; nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT 10028-23-6, Phosphoric acid, iron(2+) salt (2:3) octahydrate 10377-52-3, Lithium phosphate 14940-41-1, Iron phosphate  $\text{Fe}_3(\text{PO}_4)_2$  31096-55-6  
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)  
 (nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 7439-93-2, Lithium, uses **7782-42-5**, Graphite, uses 21324-40-3, Lithium hexafluorophosphate  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT 872-36-6, Vinylene carbonate 7440-44-0, Carbon, uses 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 24937-79-9, Poly(vinylidene fluoride)  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT 15365-14-7P, **Iron lithium phosphate**  $\text{FeLiPO}_4$   
 198782-39-7P, **Iron lithium phosphate**  
 ( $\text{FeLiO-1(PO}_4\text{)}$ )  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
 (nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

IT 7782-44-7, Oxygen, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (nonaq. electrolyte battery cathode active material capable of reversibly doping/undoping lithium)

TI Nonaqueous electrolyte battery cathode active material capable of reversibly doping/undoping lithium

AB A  $\text{LiFePO}_4$  carbon composite material is to be synthesized in a single phase satisfactorily to achieve superior cell characteristics. In prep. a cathode active material, starting materials for synthesis of a compd. represented by the general formula  $\text{Li}_x\text{FePO}_4$ , where  $0 < x \leq 1$ , are mixed, milled and a carbon material is added to the resulting mass at an optional time point in the course of mixing, milling and sintering.  $\text{Li}_3\text{PO}_4$ ,  $\text{Fe}_3(\text{PO}_4)_2$  or its hydrates  $\text{Fe}_3(\text{PO}_4)_2 \cdot n\text{H}_2\text{O}$ , where n denotes the no. of hydrates, are used as the starting materials for synthesis of  $\text{Li}_x\text{FePO}_4$ . The temp. of a product from the sintering is set to 305.degree. or less when the product from the sintering is exposed to atm. The oxygen concn. in a sintering atm. is set to 1012 ppm in vol. or less at the time point of sintering.

L18 ANSWER 24 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2002:253127 CAPLUS

DOCUMENT NUMBER: 136:281937

TITLE: Nonaqueous electrolyte battery with cathode active material capable of reversibly doping/undoping lithium

INVENTOR(S): Hosoya, Mamoru; Takahashi, Kimio; Fukushima, Yuzuru

PATENT ASSIGNEE(S): Sony Corporation, Japan

SOURCE: Eur. Pat. Appl., 16 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1193785	A2	20020403	EP 2001-122769	20010921
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2002110164	A2	20020412	JP 2000-301402	20000929
US 2002059719	A1	20020523	US 2001-956514	20010919
TW 513823	B	20021211	TW 2001-90123221	20010920
CN 1346159	A	20020424	CN 2001-138523	20010928
PRIORITY APPLN. INFO.:			JP 2000-301402	A 20000929

IT Secondary batteries  
(lithium; nonaq. electrolyte battery with cathode active material capable of reversibly doping/undoping lithium)

IT Battery cathodes  
Composites  
(nonaq. electrolyte battery with cathode active material capable of reversibly doping/undoping lithium)

IT Carbonaceous materials (technological products)  
RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte battery with cathode active material capable of reversibly doping/undoping lithium)

IT Fluoropolymers, uses  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte battery with cathode active material capable of reversibly doping/undoping lithium)

IT Ball milling  
(planetary; nonaq. electrolyte battery with cathode active material capable of reversibly doping/undoping lithium)

IT 10377-52-3, Lithium phosphate  $\text{Li}_3\text{PO}_4$  14940-41-1, Iron phosphate  $\text{Fe}_3(\text{PO}_4)_2$  31096-55-6  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)  
(nonaq. electrolyte battery with cathode active material capable of reversibly doping/undoping lithium)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate 872-36-6, Vinylene carbonate 7439-93-2, Lithium, uses 7782-42-5, Graphite, uses 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 21324-40-3, Lithium hexafluorophosphate  
RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte battery with cathode active material capable of reversibly doping/undoping lithium)

IT 7440-44-0, Carbon, uses 24937-79-9, PvdF  
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte battery with cathode active material capable of reversibly doping/undoping lithium)

IT 15365-14-7P, **Iron lithium phosphate**  $\text{FeLiPO}_4$   
198782-39-7P, **Iron lithium phosphate**  $(\text{FeLiO}-1(\text{PO}_4))$   
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(nonaq. electrolyte battery with cathode active material capable of reversibly doping/undoping lithium)

TI Nonaqueous electrolyte battery with cathode active material capable of reversibly doping/undoping lithium

AB A  $\text{LiFePO}_4$  carbon composite material is to be synthesized in a single phase satisfactorily to prevent the deterioration of the performance of the cathode active material from occurring and achieve superior cell

characteristics. In prepg. a cathode active material, starting materials for synthesis of a compd. represented by the general formula  $\text{Li}_x\text{FePO}_4$ , where  $0 < x \leq 1$ , are mixed, milled and a carbon material is added to the resulting mass at an optional time point in the course of mixing, milling and sintering.  $\text{Li}_3\text{PO}_4$ ,  $\text{Fe}_3(\text{PO}_4)_2$  or its hydrates  $\text{Fe}_3(\text{PO}_4)_2 \cdot n\text{H}_2\text{O}$ , where  $n$  denotes the no. of hydrates, are used as the starting materials for synthesis of  $\text{Li}_x\text{FePO}_4$ . The temp. of a product from the sintering is set to 305.degree. or less when the product from the sintering is exposed to atm.

L18 ANSWER 25 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2001:796403 CAPLUS  
DOCUMENT NUMBER: 135:346864  
TITLE: Cathode for nonaqueous electrolyte lithium ion battery  
INVENTOR(S): Yamada, Atsuo; Yamahira, Takayuki  
PATENT ASSIGNEE(S): Sony Corporation, Japan  
SOURCE: Eur. Pat. Appl., 26 pp.  
CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1150368	A2	20011031	EP 2001-109919	20010424
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2001307730	A2	20011102	JP 2000-128998	20000425
CA 2344981	AA	20011025	CA 2001-2344981	20010425
CN 1320976	A	20011107	CN 2001-117211	20010425
US 2002004169	A1	20020110	US 2001-842485	20010425
PRIORITY APPLN. INFO.:			JP 2000-128998	A 20000425

IT Charcoal  
RL: DEV (Device component use); USES (Uses)  
(activated; cathode for nonaq. electrolyte lithium ion battery)

IT Battery cathodes  
(cathode for nonaq. electrolyte lithium ion battery)

IT Carbon fibers, uses  
Carbonaceous materials (technological products)  
Coke  
Petroleum coke  
RL: DEV (Device component use); USES (Uses)  
(cathode for nonaq. electrolyte lithium ion battery)

IT Carbon black, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(cathode for nonaq. electrolyte lithium ion battery)

IT Fluoropolymers, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(cathode for nonaq. electrolyte lithium ion battery)

IT Organic compounds, uses  
RL: DEV (Device component use); USES (Uses)  
(high mol., sintered; cathode for nonaq. electrolyte lithium ion battery)

IT Secondary batteries  
(lithium; cathode for nonaq. electrolyte lithium ion battery)

IT Coke  
RL: DEV (Device component use); USES (Uses)  
(needle; cathode for nonaq. electrolyte lithium ion battery)

IT Coke  
RL: DEV (Device component use); USES (Uses)  
(pitch; cathode for nonaq. electrolyte lithium ion battery)



IT Furan resins  
 Phenolic resins, uses  
 RL: DEV (Device component use); USES (Uses)  
 (sintered and carbonized; cathode for nonaq. electrolyte lithium ion battery)

IT 50-21-5D, Lactic acid, ester 60-29-7, Diethyl ether, uses 64-19-7D, Acetic acid, ester, uses 75-05-8, Acetonitrile, uses 79-09-4D, Propionic acid, ester 96-47-9, 2-Methyltetrahydrofuran 96-48-0 96-49-1, Ethylene carbonate 100-66-3, Anisole, uses 105-58-8, Diethyl carbonate 107-12-0, Propionitrile 108-32-7, Propylene carbonate 109-99-9, Thf, uses 110-71-4, 1,2-Dimethoxyethane 126-33-0, Sulfolane 409-21-2, Silicon carbide sic, uses 554-12-1, Methyl propionate 616-38-6, Dimethyl carbonate 623-42-7, Methyl butyrate 623-96-1, Dipropyl carbonate 629-14-1, 1,2-Diethoxyethane 646-06-0, 1,3-Dioxolane 872-36-6, Vinylene carbonate 1072-47-5, 4-Methyl-1,3-dioxolane 1313-08-2 2550-62-1, Lithium methanesulfonate 4437-85-8, Butylene carbonate 7439-93-2, Lithium, uses 7440-50-8, Copper, uses 7447-41-8, Lithium chloride, uses 7550-35-8, Lithium bromide 7782-42-5, Graphite, uses 7791-03-9, Lithium perchlorate 9003-07-0, Polypropylene 12007-81-7, Silicon tetraboride 12008-29-6, Silicon hexaboride 12013-56-8, Calcium disilicide 12017-12-8, Cobalt disilicide 12018-09-6, Chromium disilicide 12022-99-0, Iron disilicide 12032-86-9, Manganese disilicide 12033-76-0, Silicon nitride oxide Si<sub>2</sub>N<sub>2</sub>O 12033-89-5, Silicon nitride, uses 12034-80-9, Niobium disilicide 12039-79-1, Tantalum disilicide 12039-83-7, Titanium silicide TiSi<sub>2</sub> 12039-87-1, Vanadium disilicide 12039-88-2, Tungsten disilicide 12059-14-2, Nickel silicide (Ni<sub>2</sub>Si) 12136-78-6, Molybdenum disilicide 12159-07-8, Copper silicide Cu<sub>5</sub>Si 12190-79-3, Cobalt lithium oxide CoLiO<sub>2</sub> 12201-89-7, Nickel disilicide 14283-07-9, Lithium tetrafluoroborate 14485-20-2, Lithium tetraphenylborate 15365-14-7, **Iron lithium phosphate** FeLiPO<sub>4</sub> 19414-36-9, **Iron lithium manganese phosphate** ((Fe,Mn)Li(PO<sub>4</sub>)) 21324-40-3, Lithium hexafluorophosphate 22831-39-6, Magnesium silicide (Mg<sub>2</sub>Si) 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium trifluoromethanesulfonate 35678-71-8, Methylsulfolane 90076-65-6 113066-89-0, Cobalt lithium nickel oxide Co<sub>0.2</sub>LiNi<sub>0.8</sub>O<sub>2</sub> 113671-38-8, Silicon oxide SiO<sub>2</sub> 160479-36-7, Lithium tin oxide 178958-56-0, Lithium silicon oxide 300858-61-1 339333-78-7, Zinc silicide ZnSi<sub>2</sub> 371148-86-6, Tin oxide (SnO<sub>2</sub>) 371148-87-7, Lithium magnesium manganese oxide (LiMg<sub>0.2</sub>Mn<sub>0.8</sub>O<sub>2</sub>)  
 RL: DEV (Device component use); USES (Uses)  
 (cathode for nonaq. electrolyte lithium ion battery)

IT 24937-79-9, PvdF  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (cathode for nonaq. electrolyte lithium ion battery)

IT 7440-44-0, Carbon, uses  
 RL: DEV (Device component use); USES (Uses)  
 (pyrocarbon; cathode for nonaq. electrolyte lithium ion battery)

TI Cathode for nonaqueous electrolyte lithium ion battery

AB The lithium ion cell is improved appreciably in operational stability under special conditions, such as high temps., and exhibits superior characteristics against over-discharging, while guaranteeing compatibility to the operating voltage of a conventional lithium ion cell and an energy d. equiv. to that of the conventional lithium ion cell. To this end, the lithium ion cell includes a pos. electrode, a neg. electrode and a nonaq. electrolyte, and uses, as a pos. electrode active material, a composite material of a first lithium compd. represented by the general formula Li<sub>x</sub>MyPO<sub>4</sub>, where 0 < x < 2, 0.8 < y < 1.2 and M contains Fe, and a second lithium compd. having a potential holder than the potential of the first lithium compd.

ACCESSION NUMBER: 2000:790241 CAPLUS  
 DOCUMENT NUMBER: 133:323991  
 TITLE: Phosphate additives for nonaqueous electrolyte in rechargeable lithium ion batteries  
 INVENTOR(S): Gan, Hong; Takeuchi, Esther S.  
 PATENT ASSIGNEE(S): Wilson Greatbatch Ltd., USA  
 SOURCE: Eur. Pat. Appl., 14 pp.  
 CODEN: EPXXDW  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 3  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1050916	A1	20001108	EP 2000-303719	20000503
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
US 6203942	B1	20010320	US 1999-303877	19990503
JP 2000331710	A2	20001130	JP 2000-132538	20000501
PRIORITY APPLN. INFO.:			US 1999-303877	A 19990503
			US 1998-105279P	P 19981022

OTHER SOURCE(S): MARPAT 133:323991  
 IT Secondary batteries  
 (lithium; phosphate additives for nonaq. electrolyte in rechargeable lithium ion batteries)  
 IT Battery electrolytes  
 (phosphate additives for nonaq. electrolyte in rechargeable lithium ion batteries)  
 IT Alkali metals, uses  
 Carbon black, uses  
 Carbon fibers, uses  
 Coke  
 RL: DEV (Device component use); USES (Uses)  
 (phosphate additives for nonaq. electrolyte in rechargeable lithium ion batteries)  
 IT Fluoropolymers, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (phosphate additives for nonaq. electrolyte in rechargeable lithium ion batteries)  
 IT 7440-44-0, Carbon, uses  
 RL: DEV (Device component use); USES (Uses)  
 (glassy; phosphate additives for nonaq. electrolyte in rechargeable lithium ion batteries)  
 IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 556-65-0, Lithium thiocyanate 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate 623-96-1, Dipropyl carbonate 872-36-6, Vinylene carbonate 2923-17-3 2923-20-8 4437-85-8, Butylene carbonate 7439-93-2, Lithium, uses 7782-42-5, Graphite, uses 7790-69-4, Lithium nitrate 7791-03-9, Lithium perchlorate 11113-67-0, Iron Lithium oxide 11126-15-1, Lithium vanadium oxide 12031-63-9, Lithium niobium oxide (LiNbO3) 12190-79-3, Cobalt lithium oxide colio2 12680-08-9, Lithium titanium sulfide 13453-75-3, Lithium fluorosulfate 14024-11-4, Lithium tetrachloroaluminate 14283-07-9, Lithium tetrafluoroborate 14485-20-2, Lithium tetraphenylborate 15955-98-3, Lithium tetrachlorogallate 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 33454-82-9, Lithium triflate 35363-40-7, Ethyl propyl carbonate 37296-91-6, Lithium molybdenum oxide 37367-96-7, Lithium molybdenum sulfide 39300-70-4, Lithium nickel oxide 39302-37-9, Lithium titanium oxide 39457-42-6, Lithium manganese oxide 51177-06-1, Chromium Lithium oxide

52627-24-4, Cobalt Lithium oxide 56321-19-8, Lithium niobium sulfide  
 56525-42-9, Methyl propyl carbonate 61673-65-2, Lithium niobium selenide  
 61673-69-6, Lithium titanium selenide 61673-70-9, Lithium titanium  
 telluride 61673-71-0, Lithium vanadium selenide 74245-06-0, Lithium  
 vanadium sulfide 80341-49-7, **Iron Lithium** sulfide  
 90076-65-6 96352-80-6, Lithium molybdenum selenide 96352-81-7, Lithium  
 molybdenum telluride 103288-79-5, Cobalt Lithium sulfide 104708-77-2,  
 Copper Lithium oxide 115028-88-1 132404-42-3 148884-75-7, Cobalt  
 Lithium selenide 264142-74-7, Lithium vanadium telluride 264142-75-8,  
 Chromium Lithium sulfide 264142-76-9, Chromium Lithium selenide  
 264142-77-0, Chromium Lithium telluride 264142-78-1, Copper Lithium  
 sulfide 264142-79-2, Copper Lithium selenide 264142-81-6, Lithium  
 niobium telluride 264142-82-7, **Iron Lithium** selenide  
 264142-83-8, **Iron Lithium** telluride 264142-84-9,  
 Lithium nickel sulfide 264142-85-0, Lithium nickel selenide  
 264142-86-1, Lithium nickel telluride 264142-87-2, Cobalt Lithium  
 telluride 264142-88-3, Lithium manganese sulfide 264142-89-4, Lithium  
 manganese selenide 264142-90-7, Lithium manganese telluride  
 RL: DEV (Device component use); USES (Uses)

(phosphate additives for nonaq. electrolyte in rechargeable  
 lithium ion batteries)

IT 107-66-4, Dibutylphosphate 598-02-7, Diethyl phosphate 701-64-4,  
 Monophenyl phosphate 812-00-0, Monomethyl phosphate 813-78-5, Dimethyl  
 phosphate 838-85-7, Diphenyl phosphate 884-90-2, Phosphoric acid,  
 benzyl Diethyl ester 1623-06-9, Monopropyl phosphate 1623-07-0, Benzyl  
 phosphate 1623-14-9, Monoethyl phosphate 1623-15-0, Monobutyl  
 phosphate 1707-92-2, Tribenzyl phosphate 1804-93-9, Dipropyl phosphate  
 3066-75-9 7748-09-6, Diallyl phosphate 10497-05-9,  
 Tris(trimethylsilyl)phosphate 28519-15-5, Phosphoric acid, benzyl  
 dibutyl ester 32636-65-0, Diethyl Diphenylmethyl phosphate 67293-73-6,  
 Phosphoric acid, dimethyl phenylmethyl ester 269402-58-6, Phosphoric  
 acid, phenylmethyl Dipropyl ester  
 RL: MOA (Modifier or additive use); USES (Uses)

(phosphate additives for nonaq. electrolyte in rechargeable lithium ion  
 batteries)

TI Phosphate additives for nonaqueous electrolyte in rechargeable lithium ion  
 batteries

AB In a lithium ion electrochem. cell having high charge/discharge capacity,  
 long cycle life and exhibiting a reduced first cycle irreversible  
 capacity, at least one phosphate additive is added to an electrolyte  
 comprising an alkali metal salt dissolved in a solvent mixt. that includes  
 ethylene carbonate, di-Me carbonate, ethylmethyl carbonate and di-Et  
 carbonate. The phosphate additive has the formula: (R1O)P(:O)(OR2)(OR3)  
 and wherein if R1, R2, and R3 are the same or different and may represent  
 a H atom or a satd. or unsatd. org. group contg. 1-13 C atoms and wherein  
 R1, R2, and R3 are not H, at least one of them is CR4R5R6 wherein R4 is an  
 arom. substituent or an unsatd. org. or inorg. group and R5 and R6 are the  
 same or different and may represent a H atom or a satd. or unsatd. org. or  
 inorg. group; with the proviso that the phosphate additive is not dibenzyl  
 phosphate. The preferred additive is an alkyl phosphate compd.

REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS  
 RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L18 ANSWER 27 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2000:774123 CAPLUS

DOCUMENT NUMBER: 133:352634

TITLE: Electrode materials having increased surface  
 conductivity

INVENTOR(S): Ravet, Nathalie; Besner, Simon; Simoneau, Martin;  
 Vallee, Alain; Armand, Michel; Magnan, Jean-francois

PATENT ASSIGNEE(S): Hydro-Quebec, Can.

SOURCE: Eur. Pat. Appl., 22 pp.

CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: French  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1049182	A2	20001102	EP 2000-401207	20000502
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
CA 2307119	AA	20001030	CA 2000-2307119	20000428
JP 2001015111	A2	20010119	JP 2000-132779	20000501
US 2002195591	A1	20021226	US 2002-175794	20020621
PRIORITY APPLN. INFO.:			CA 1999-2270771	A 19990430
			US 2000-560572	B1 20000428

IT Metallic fibers  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(aluminum; electrode materials having increased surface cond.)

IT Windows  
Windows  
(electrochromic; electrode materials having increased surface cond.)

IT Battery cathodes  
Capacitor electrodes  
Electrochromic materials  
Electrodes  
Primary batteries  
Secondary batteries  
Thermal decomposition  
(electrode materials having increased surface cond.)

IT Oxides (inorganic), uses  
Oxynitrides  
Phosphates, uses  
Silicates, uses  
Sulfates, uses  
RL: DEV (Device component use); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(electrode materials having increased surface cond.)

IT Carbon black, uses  
EPDM rubber  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(electrode materials having increased surface cond.)

IT Hydrocarbons, reactions  
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)  
(electrode materials having increased surface cond.)

IT Organic compounds, reactions  
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)  
(electrode materials having increased surface cond.)

IT Polymers, reactions  
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)  
(electrode materials having increased surface cond.)

IT Polyolefins  
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)  
(electrode materials having increased surface cond.)

IT Polysaccharides, reactions  
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC

(Process); RACT (Reactant or reagent)  
 (electrode materials having increased surface cond.)

IT Polyoxyalkylenes, uses  
 RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)  
 (electrolytes; electrode materials having increased surface cond.)

IT Primary batteries  
 Secondary batteries  
 (lithium; electrode materials having increased surface cond.)

IT Fluorides, uses  
 RL: DEV (Device component use); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (oxyfluorides; electrode materials having increased surface cond.)

IT Electrolytic capacitors  
 (supercapacitors; electrode materials having increased surface cond.)

IT Electrochromic devices  
 Electrochromic devices  
 (windows; electrode materials having increased surface cond.)

IT 7440-44-0P, Carbon, uses 15365-14-7P, **Iron lithium phosphate** (FeLiPO<sub>4</sub>) 30734-08-8P, Lithium manganese silicate Li<sub>2</sub>MnSiO<sub>4</sub> 39302-37-9P, Lithium titanium oxide 180984-63-8P, Lithium magnesium titanium oxide 252943-50-3P, Lithium vanadium phosphate silicate Li<sub>3</sub>.5V<sub>2</sub>(PO<sub>4</sub>)<sub>2</sub>.5(SiO<sub>4</sub>)<sub>0.5</sub> 304905-30-4P 304905-31-5P, Iron lithium fluoride (FeLi<sub>0.2</sub>F<sub>3</sub>) 304905-32-6P, Lithium manganese nitride oxide (Li<sub>3</sub>MnNO) 304905-33-7P 304905-34-8P 304905-35-9P, Lithium magnesium titanium oxide (Li<sub>3</sub>.5Mg<sub>0.5</sub>Ti<sub>4</sub>O<sub>12</sub>) 304905-36-0P, Iron lithium phosphorus silicon oxide 304905-37-1P 304905-38-2P, Iron lithium phosphorus fluoride oxide 304905-39-3P 304905-40-6P 304905-41-7P 304905-42-8P  
 RL: DEV (Device component use); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (electrode materials having increased surface cond.)

IT 1314-35-8, Tungsten oxide WO<sub>3</sub>, uses **7782-42-5**, Graphite, uses 50926-11-9, Indium tin oxide 65324-39-2, Celgard 2400  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (electrode materials having increased surface cond.)

IT 1333-74-0, Hydrogen, uses 7440-37-1, Argon, uses 7440-59-7, Helium, uses 7727-37-9, Nitrogen, uses 7782-44-7, Oxygen, uses  
 RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
 (electrode materials having increased surface cond.)

IT 78-10-4 109-72-8, Butyl lithium, uses 546-68-9 553-91-3, Lithium oxalate 554-13-2, Lithium carbonate 1310-65-2, Lithium hydroxide 1344-43-0, Manganese oxide MnO, uses 5931-89-5, Cobalt acetate 5965-38-8, Cobalt oxalate dihydrate 6108-17-4, Lithium acetate dihydrate 6156-78-1, Manganese acetate tetrahydrate 6556-16-7, Manganese oxalate dihydrate 7722-76-1, Ammonium dihydrogen phosphate 7783-50-8, Iron fluoride FeF<sub>3</sub> 7803-55-6, Ammonium vanadate 9003-01-4, Polyacrylic acid 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 10028-22-5, Ferric sulfate 10102-24-6, Lithium silicate Li<sub>2</sub>SiO<sub>3</sub> 10377-52-3, Lithium phosphate Li<sub>3</sub>PO<sub>4</sub> 13463-10-0, Ferric phosphate dihydrate 14567-67-0, Vivianite 16674-78-5, Magnesium acetate tetrahydrate 25656-42-2, Lithium polyacrylate 26134-62-3, Lithium nitride 145673-07-0  
 RL: NUU (Other use, unclassified); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)  
 (electrode materials having increased surface cond.)

IT 304905-43-9 305324-61-2  
 RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)  
 (electrode materials having increased surface cond.)

IT 57-50-1, reactions 77-47-4, Hexachlorocyclopentadiene 98-00-0D, Furfuryl alcohol, derivs., polymers 100-42-5D, Styrene, derivs., polymers 107-13-1D, Acrylonitrile, derivs., polymers 108-05-4D, Vinyl acetate, derivs., polymers 108-95-2D, Phenol, derivs., polymers, reactions 115-07-1, 1-Propene, reactions 120-12-7, Anthracene, reactions 128-69-8D, 3,4,9,10-Perylenetetracarboxylic acid dianhydride, polymers with Jeffamine 600 198-55-0D, Perylene, derivs., polymers 630-08-0, Carbon monoxide, reactions 996-70-3, Tetrakis(dimethylamino)ethylene 1321-74-0D, Divinylbenzene, derivs., polymers 6674-22-2, DBU **9002-88-4** 9002-89-5 **9003-07-0**, Polypropylene 9003-17-2D, Polybutadiene, derivs. 9004-34-6D, Cellulose, derivs., reactions 9004-35-7, Cellulose acetate 9005-25-8D, Starch, derivs., reactions 15133-82-1, Tetrakis(triphenylphosphine)nickel 25014-41-9, Polyacrylonitrile 51736-72-2, Polyvinylidene bromide 157889-12-8, Jeffamine ED 600-perylenetetracarboxylic acid dianhydride copolymer  
 RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)

(electrode materials having increased surface cond.)

IT 75-05-8, Acetonitrile, uses 96-48-0, .gamma.-Butyrolactone 96-49-1, Ethylene carbonate 110-71-4 616-38-6, Dimethyl carbonate 646-06-0, Dioxolane 2832-49-7, Tetraethylsulfamide 21324-40-3, Lithium hexafluorophosphate LiPF<sub>6</sub> 25322-68-3 66950-70-7 90076-65-6, Lithium bis(trifluoromethanesulfonyl)imide

RL: NUU (Other use, unclassified); TEM (Technical or engineered material use); USES (Uses)

(electrolytes; electrode materials having increased surface cond.)

IT 7429-90-5, Aluminum, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(foils, grills; electrode materials having increased surface cond.)

IT 7439-93-2, Lithium, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(foils; electrode materials having increased surface cond.)

IT 7440-50-8, Copper, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(grills; electrode materials having increased surface cond.)

IT 7440-02-0, Nickel, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(substrates; electrode materials having increased surface cond.)

TI Electrode materials having increased surface conductivity

AB Intercalated electrode materials comprising complex oxides, esp. Li oxides, are prepd., suitable for redox reaction by exchange of alkali metal ions (esp. Li) and electrons with an electrolyte. The complex oxide electrodes can be used in batteries, supercapacitors or electrochromic light moderators. The complex oxides have the general formula A<sub>a</sub>M<sub>m</sub>Z<sub>z</sub>O<sub>o</sub>N<sub>n</sub>F<sub>f</sub>, where A is alkali metal (e.g., Li), M is .gtoreq.1 transition metal (e.g., Fe, Mn, V, Ti, Mo, Nb, Zn, W), Z is .gtoreq.1 nonmetal (e.g., P, S, Si, Se, As, Ge, B, Sn), and a,m,z,o,n,f are chosen for elec. neutrality. A conductive carbon coating is formed or deposited on the surface of the electrode material, e.g., by pyrolysis of an org. material, hydrocarbons or polymers, for increased surface cond.

L18 ANSWER 28 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:509379 CAPLUS

DOCUMENT NUMBER: 129:191547

TITLE: Nonaqueous-electrolyte lithium secondary battery having high discharge capacity

INVENTOR(S): Nagata, Mikito; Karril, Amin; Tsukamoto, Kotobuki

PATENT ASSIGNEE(S): Japan Storage Battery Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 10208730	A2	19980807	JP 1997-25985	19970124

PRIORITY APPLN. INFO.: JP 1997-25985 19970124

IT Battery cathodes  
 (Li secondary batteries with cathodes contg. Li metal oxide and Li+ supplier additives)

IT Coke  
 RL: DEV (Device component use); USES (Uses)  
 (anode; Li secondary batteries with cathodes contg. Li metal oxide and Li+ supplier additives)

IT Battery anodes  
 (oxide; Li secondary batteries with cathodes contg. Li metal oxide and Li+ supplier additives)

IT 7440-44-0, Carbon, uses 7631-86-9, Silica, uses **7782-42-5**, Graphite, uses 18282-10-5, Tin oxide (SnO<sub>2</sub>) 21651-19-4, Tin oxide (SnO) 39432-42-3, Tin hydroxide oxide Sn<sub>3</sub>(OH)<sub>2</sub>O<sub>2</sub> 186448-61-3, Lithium oxide silicide (Li<sub>2</sub>O<sub>2</sub>Si) 211753-60-5, Lithium tin oxide (LiSnO<sub>2</sub>)  
 RL: DEV (Device component use); USES (Uses)  
 (anode; Li secondary batteries with cathodes contg. Li metal oxide and Li+ supplier additives)

IT 12057-17-9, Lithium manganese oxide (LiMn<sub>2</sub>O<sub>4</sub>) 12162-79-7, Lithium manganese oxide (LiMnO<sub>2</sub>) 12325-84-7, Lithium nickel oxide (Li<sub>2</sub>NiO<sub>2</sub>) 36058-25-0, **Lithium iron phosphate** [Li<sub>3</sub>Fe<sub>2</sub>(PO<sub>4</sub>)<sub>3</sub>] 123550-86-7, Lithium manganese oxide (Li<sub>0.5</sub>-1MnO<sub>2</sub>) 186131-68-0, **Iron lithium vanadium phosphate** (FeLi<sub>3</sub>V(PO<sub>4</sub>)<sub>3</sub>) 200938-46-1, Lithium manganese nickel oxide (Li<sub>2</sub>Mn<sub>1.5</sub>Ni<sub>0.5</sub>O<sub>4</sub>) 211753-57-0, Lithium vanadium oxide (Li<sub>1</sub>-6VO<sub>3</sub>) 211753-58-1, Iron lithium sulfate (Fe<sub>2</sub>Li<sub>3</sub>(SO<sub>4</sub>)<sub>3</sub>) 211753-59-2, Lithium vanadium phosphate (Li<sub>3</sub>V(PO<sub>4</sub>)<sub>3</sub>)  
 RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)  
 (lithium ion supplier in cathode; Li secondary batteries with cathodes contg. Li metal oxide and Li+ supplier additives)

TI Nonaqueous-electrolyte lithium secondary battery having high discharge capacity

AB In the title battery, cathode contains a Li-contg. metal oxide as an active mass and another substance having Li+-discharging potential higher than that of the metal oxide and of amt. corresponding to an amt. of Li+ consumed in the initial charging. Preferably, the substance is selected from Li<sub>1+x</sub>Mn<sub>2</sub>O<sub>4</sub> (X = 0-1), Li<sub>2</sub>NiO<sub>2</sub>, LiMnO<sub>2</sub>, Li<sub>2</sub>Mn<sub>2-x</sub>MxO<sub>4</sub> (M = Co, Ni, Zn, Mg, Fe; X = 0-2), Li<sub>2</sub>Mn<sub>1.5</sub>Ni<sub>0.5</sub>O<sub>4</sub>, Li<sub>x</sub>VO<sub>3</sub> (X = 1-6), Li<sub>3</sub>Fe<sub>2</sub>(PO<sub>4</sub>)<sub>3</sub>, Li<sub>3</sub>Fe<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>, Li<sub>3</sub>FeV(PO<sub>4</sub>)<sub>3</sub>, and Li<sub>3</sub>V(PO<sub>4</sub>)<sub>3</sub>. Anode in the battery may be selected from graphite, coke, (amorphous) carbon, SnO, SnO<sub>2</sub>, Sn<sub>1-x</sub>MxO (M = Hg, P, B, Si, Ge Sb; 0 .ltoreq. X < 1), Sn<sub>1-x</sub>MxO<sub>2</sub> (M = Hg, P, B, Si, Ge, Sb; 0 .ltoreq. X < 1), Sn<sub>3</sub>O<sub>2</sub>(OH)<sub>2</sub>, Sn<sub>3-x</sub>MxO<sub>2</sub>(OH)<sub>2</sub> (M = Mg, P, B, Si, Ge, Sb, As, Mn; 0 .ltoreq. X < 3), LiSiO<sub>2</sub>, SiO<sub>2</sub>, and LiSnO<sub>2</sub>. Lack of Li+ consumed in formation of a surficial film on the anode and Li+ trapped in the anode both occurring in the initial charging is supplemented by the substance.

L18 ANSWER 29 OF 29 CAPLUS COPYRIGHT 2003 ACS on STN  
 ACCESSION NUMBER: 1998:509367 CAPLUS  
 DOCUMENT NUMBER: 129:151162

TITLE: Electrolytic composition with polymer base for electrochemical generator

INVENTOR(S): Vallee, Alain; Armand, Michel; Choquette, Yves; Belanger, Andre; Gauthier, Michel; Perrier, Michel; Zaghib, Karim; Potvin, Estelle; Besner, Simon

PATENT ASSIGNEE(S): Hydro-Quebec, Can.

SOURCE: PCT Int. Appl., 56 pp.  
CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: French

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 9832183	A1	19980723	WO 1998-CA18	19980119
W: CA, JP, US				
RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
CA 2195387	AA	19980717	CA 1997-2195387	19970117
CA 2249630	AA	19980723	CA 1998-2249630	19980119
EP 890192	A1	19990113	EP 1998-900830	19980119
R: DE, FR, GB, IT				
JP 2000507387	T2	20000613	JP 1998-533444	19980119
US 6280882	B1	20010828	US 1998-142055	19981214
US 2001041295	A1	20011115	US 2001-878356	20010612
PRIORITY APPLN. INFO.:			CA 1997-2195387	A 19970117
			CA 1997-2221985	A 19971124
			WO 1998-CA18	W 19980119
			US 1998-142055	A3 19981214

IT Carbon black, uses  
RL: DEV (Device component use); USES (Uses)  
(cathode for battery with electrolyte contg. polymer matrix)

IT Battery anodes  
Battery cathodes  
(for batteries with electrolyte contg. polymer matrix)

IT EPDM rubber  
Fluoropolymers, uses  
Polyethers, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(in polymer matrix for battery electrolyte)

IT Secondary batteries  
(lithium; with electrolyte contg. polymer matrix)

IT Battery electrolytes  
(with polymer matrix)

IT 7439-93-2, Lithium, uses 7782-42-5, Graphite, uses  
RL: DEV (Device component use); USES (Uses)  
(anode for battery with electrolyte contg. polymer matrix)

IT 96-47-9, 2-Methyltetrahydrofuran 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate 109-99-9, Tetrahydrofuran, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(aprotic solvent; in polymer matrix for battery electrolyte)

IT 1313-13-9, Manganese oxide (MnO<sub>2</sub>), uses 12039-13-3, Titanium sulfide (TiS<sub>2</sub>) 12190-79-3, Lithium cobalt oxide (LiCoO<sub>2</sub>) 14283-07-9, Lithium tetrafluoroborate  
RL: DEV (Device component use); USES (Uses)  
(cathode for battery with electrolyte contg. polymer matrix)

IT 21324-40-3, Lithium hexafluorophosphate  
RL: TEM (Technical or engineered material use); USES (Uses)  
(in battery electrolyte)

IT 96-48-0, .gamma.-Butyrolactone 110-71-4, 1,2-Dimethoxyethane 111-96-6, Bis(2-methoxyethyl) ether 126-33-0, Sulfolane 629-14-1, 1,2-Diethoxyethane 646-06-0, 1,3-Dioxolane 872-93-5, 3-Methylsulfolane



1634-04-4, tert-Butyl methyl ether 3290-92-4, Trimethylolpropane trimethacrylate 4437-85-8, Butylene carbonate 4986-89-4, Pentaerythritol tetraacrylate 5137-45-1, 1,2-Ethoxymethoxyethane 5459-38-1, Glycerol triacrylate 6163-66-2, tert-Butyl ether 7401-88-9, Glycerol trimethacrylate 9011-14-7, Polymethyl methacrylate 9011-17-0 13372-33-3, 4,4-Dimethyl-1,3-Dioxolane 15625-89-5, Trimethylolpropane triacrylate 24937-79-9, PVDF 25014-41-9, Polyacrylonitrile 25852-47-5, Polyoxyethylene dimethacrylate 26570-48-9, Polyoxyethylene diacrylate 29570-58-9, Dipentaerythritol hexaacrylate 52408-84-1 60506-81-2, Dipentaerythritol pentaacrylate 94108-97-1, Di(trimethylolpropane) tetraacrylate

RL: TEM (Technical or engineered material use); USES (Uses)  
(in polymer matrix for battery electrolyte)

IT 10045-86-0, **Iron phosphate**

RL: DEV (Device component use); USES (Uses)  
(**lithium**-contg.; cathode for battery with electrolyte contg. polymer matrix)

TI Electrolytic composition with polymer base for electrochemical generator

AB The invention concerns an aprotic electrolytic compn. located in the separator and in .gtoreq.1 composite electrode contg. a powder of an active electrode material, and if necessary an electronic conduction additive of an electrochem. generator. The electrolytic compn. comprises a 1st polymer matrix consisting of a polyether and .gtoreq.1 2nd polymer matrix, macroscopically sepd., and also .gtoreq.1 alk. salt as well as a polar aprotic solvent. The polymer matrixes can be swollen by .gtoreq.1 of the polar aprotic solvents. The solvent or mixt. of solvents is unevenly distributed between the polymer matrixes. The invention also concerns an electrochem. generator comprising a neg. electrode and pos. electrode reversible to alk. ions and a separator with polymer electrolyte, the electrolytic component of which is described. The invention further concerns the manuf. in 2 or 3 steps of a sub-assembly of an electrochem. generator by coating an electrode support with a composite electrode contg. the 2nd matrix, followed by a surface coating on the electrode resulting from the preceding step with a soln. contg. the 1st polymer matrix to form the separator wholly or partly.

REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD. AL